APR 30 1956

NINETY•SEVENTH YEAR

AMERICAN Gas Journal

Southern Gas Association Issue

MAY, 1956

Only Magazine Published Exclusively for the Gas Utility Industry

REYNOLDS

THE LIBRARY OF CONGRESS SERIAL RECORD MAY 1 - 1956 COPY

regulators have complete interchangeability

Bodies for pounds to inches regulation—interchangeable with bodies for pounds to pounds regulation —not necessary to take unit out of piping.

OBILE REGULATOR PIT

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Anderson, Indiana, U.S.A.

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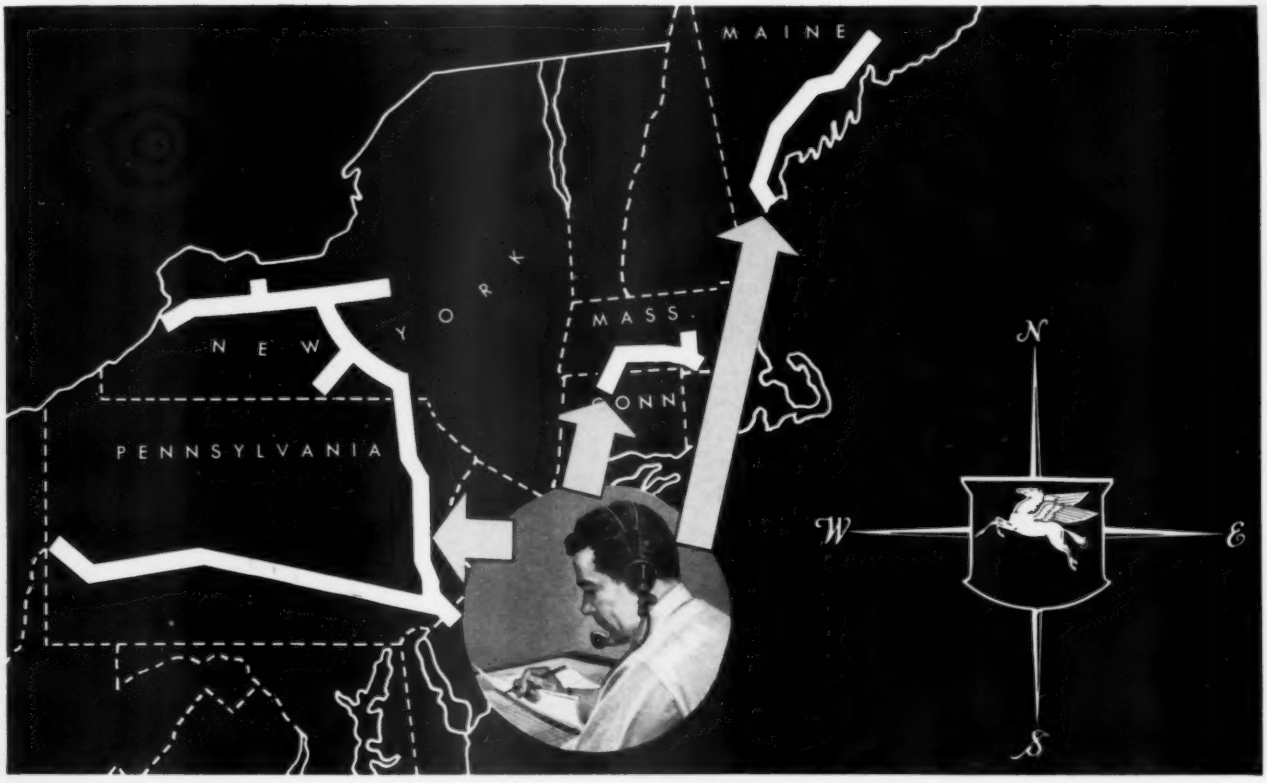

The dispatcher receives hourly reports on pressure, temperature, gravity, and rate-of-flow from each station on three pipe lines.

SOCONY MOBIL OIL COMPANY, INC., REPORTS:

One dispatcher controls three eastern pipe lines with Bell System private line telephone service

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NINETY-SEVENTH YEAR

AMERICAN Gas Journal

May 1956 — Only Magazine Published Exclusively for the Gas Utility Industry

IMPORTANT ANNOUNCEMENT

With this issue, AMERICAN GAS JOURNAL proudly re-introduces an old friend in a new suit of clothes — a revised, up-to-date *American Gas Fundamentals*.

When the *Fundamentals* series was begun several years ago, the intent was to provide a comprehensive series of articles explaining the gas industry and its technology — a continuing educational course. It became a hit overnight, and literally thousands of requests for reprints, of both individual articles and for the entire series, poured in the AGJ offices. The original *Fundamentals* was concluded sometime back and published in book form. But these requests have continued, and with the reprints no longer available, another course was necessary.

Many industry men offered helpful counsel and suggestions on additional information to include in the series and improvements to be made. And with the passing of time, many new ideas and methods have been introduced into our industry, making revision a necessity.

With this in mind, AGJ's editors instituted a program of complete revision of the series — many months back. Working with industry authorities, they have come up with new, up-to-date editorial program to provide the most recent information available.

The first phase of the new *American Gas Fundamentals* begins with this issue. It is a complete Glossary of Gas Industry Terms. In subsequent articles, everything from the production of gas to adjusting the burner on your range at home will be discussed.

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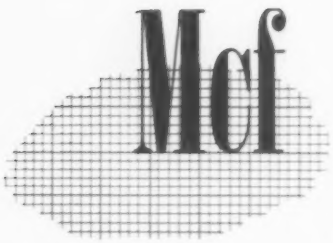

An attractive little 8-page pamphlet entitled "Nine Tips on Enjoying Modern Gas Service", prepared by the Public Information Bureau of AGA, is now in its second printing. The first press run was more than oversubscribed by gas companies who plan to distribute copies to customers on their lines. The pamphlet contains common sense pointers to help the public use gas and gas appliances safely and efficiently.

Florida Power Corporation plans to burn natural gas instead of coal or oil at four of its generating plants. The reason — gas is 20 to 25 per cent cheaper as a generating fuel than either coal or oil, which are expensive because of long-haul transportation costs.

Colorado Interstate Gas Company plans to spend $76,000,000 in 1957 on expansion, boosting its two-year program (56-57) to over $116,000,000. The sum would cover the construction of 800 miles of new line, six new compressor stations, and other improvements. The overall program is designed to bring natural gas from Canada and the Rocky Mountains to major markets in the midwest area of Illinois, Indiana, and Iowa. The gas would be sold to Natural Gas Pipeline Company for delivery to those markets.

Brooklyn Union Gas Company set new highs in 1955 in gas sales, revenues, and net income, according to the firm's annual report. Revenues were $54,638,904 and net income was $5,039,368, or $2.70 per share. Gas sales increased to 25,485,000 Mcf, compared to 23,491,000 Mcf in 1954. Lower temperatures during the year contributed approximately 14 cents per share toward the year's improvement, according to John E. Heyke, president.

The U. S. Supreme Court has declined to review a lower court ruling that the FPC had no authority to suspend increased wholesale rates on gas supplied for resale to Michigan Wisconsin Pipe Line by Phillips Petroleum Company under an escalator clause of the contract that was in effect on June 7, 1954 (date of the Supreme Court decision on the Natural Gas Act giving FPC jurisdiction over independent gas producers). The lower court said the original contract, together with letter agreements, were integrated parts.

Advertising by a major U. S. manufacturer of electric appliances that their 2600-watt Calrod unit is "faster than gas" is continuing, mostly by dealers, despite scores of protests by gas companies and some action by local Better Business Bureaus. Factual answers in the form of news releases and suggested copy for newspaper advertisements is being furnished gas utilities by the AGA for whatever use the companies care to make of them. **The electric cooking unit "faster" claim applies only to boiling of water in a flat bottom, straight sided aluminum pot, 9-in. in diameter.** *Using other cooking utensils, the electric unit has been found slower than contemporary 12,000 Btu gas burner units, and claims to the contrary are misleading.*

Gas ranges, water heaters, and central heating equipment continues to set new records in total units shipped during the month of February according to the Gas Appliance Manufacturers Association. Water heater shipments in February were 251,000 units, 10 per cent above the same month in 1955. Total January-February shipments were 480,400 units — another record. Some domestic gas range shipments in February total 184 units, 21.3 above January. Total shipments during January and February were 336,200 gas fired central heating equipment of all types showed substantial gains over February, 1955, figures with gas furnaces setting an all time record. Gas furnace manufacturers shipped 51,700 units, an 8.4 per cent increase; boiler shipments total 5100 units, a gain of 37.8 per cent, while conversion burners were 7400 units, a 15.6 per cent rise.

The whole system of appliance merchandising needs to be revised, according to S. E. Wolkenheim, director of marketing of the A. O. Smith Corporation. A healthy selling and sound customer service program are twin needs of the appliance industry. Wolkenheim, in a recent talk, urged that dealers have sufficient margin to adequately train sales and service forces. He pointed out that sound selling is too much the exception, and that it is the fellow with the lowest price who gets the order. Retailers are not wholly responsible.

Total sales of the gas utilities and pipe line industries to ultimate consumers during February amounted to 8113 million therms, an increase of 6.9 per cent over February, 1955. Industrial sales were up 5.7 per cent over last year compared to the industrial production index of the Federal Power Reserve Board which showed a rise of 7.5 per cent. Natural gas sales to ultimate consumers was up 7.0 over last year for February while total manufactured and mixed gas sales increased 4.9 per cent.

Atlantic Seaboard Corporation will build 68 miles of loop line in West Virginia and Virginia this year to enable it to transport greater volumes of gas for the 1956-57 heating season. Total estimate of the new construction is $8,521,000. The new facilities will still leave Seaboard with a deficiency of 9,500,000 cu ft which will be met by curtailing some interruptable industrial loads on peak days.

A proposed amendment to its ruling, which would provide that independent gas producers sales contracts containing certain types of escalator clauses and favored nation clauses would not be accepted after July 1 is being considered by the FPC. Any interested person has until June 1 to submit their views and opinions on the proposed amendment.

Pacific Northwest Pipe Line Corporation has received FPC approval on a plan to increase the pipe system on two laterals in the State of Washington, and to build 50 miles of new line in Colorado. Pacific's Walla Walla lateral will be increased from 4-in. to 6-in. pipe and the Yakima-Wenatchee will be increased to 10- and 8-in in place of 8- and 6-in. The new Colorado facilities will be built to serve two industrial customers — Union Carbide Nuclear Company at Uravan, Colorado and Vanadium Corporation of America, at Nucla, Colorado.

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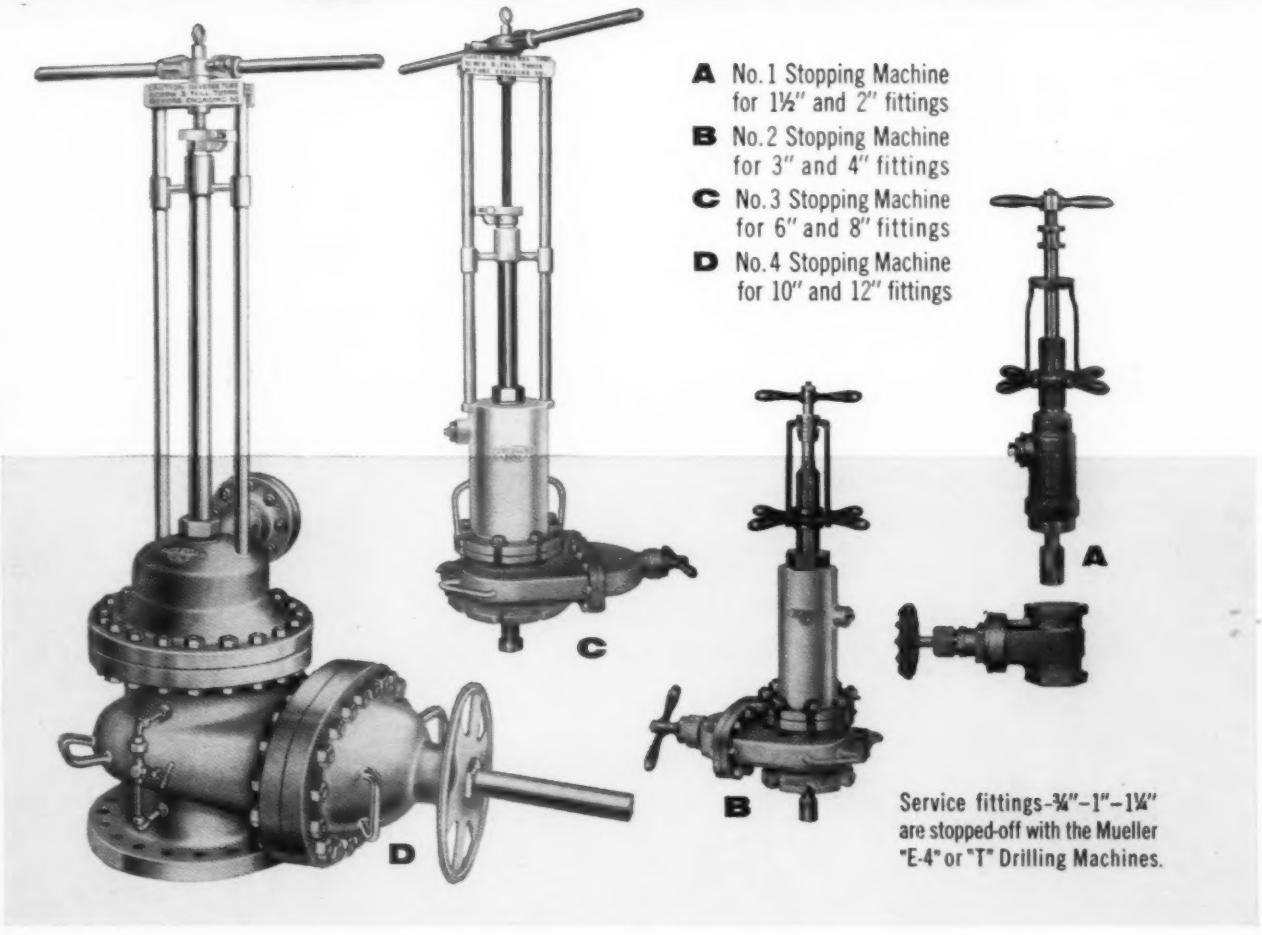
A No. 1 Stopping Machine for 1½" and 2" fittings
B No. 2 Stopping Machine for 3" and 4" fittings
C No. 3 Stopping Machine for 6" and 8" fittings
D No. 4 Stopping Machine for 10" and 12" fittings
A
B
C
D
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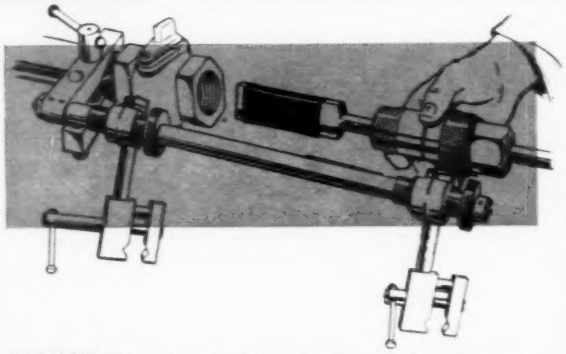

STEP 1: Attach safety clamp and plugging unit.
Close stop. Remove house piping from stop outlet. Attach safety clamp to inlet pipe. Retract plug and screw plugging unit into stop.

Replace worn, damaged or obsolete gas stops under full line pressure – no outside shut-off required. The Mueller No-Blo Stop Changer may be used on ¾"–1"–1¼" straight or round way gas stops. Separate plugging unit for each size stop is used with a standard clamp to replace gas stops safely, under pressures up to 60 p.s.i.

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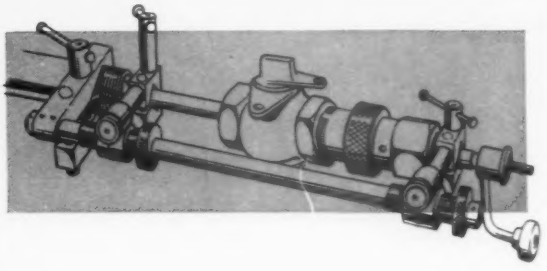
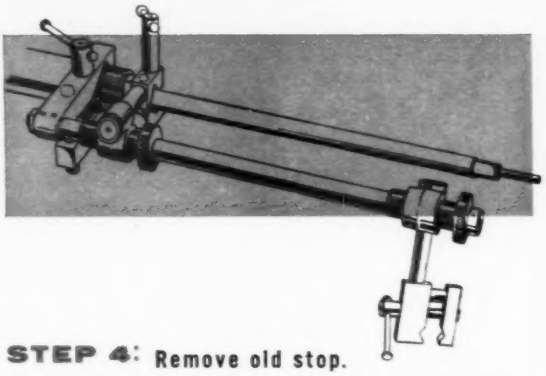


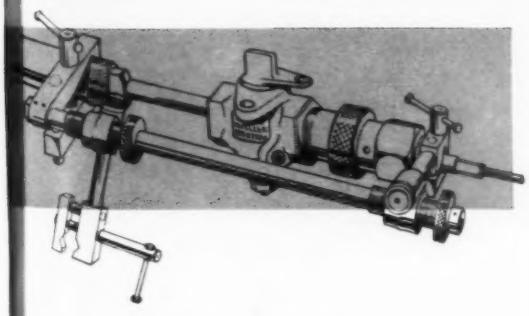
STEP 3: Unscrew old stop.
Unscrew old stop – slide to rear. Position front clamp by adjusting threaded sleeve. Tighten front clamp on shaft.



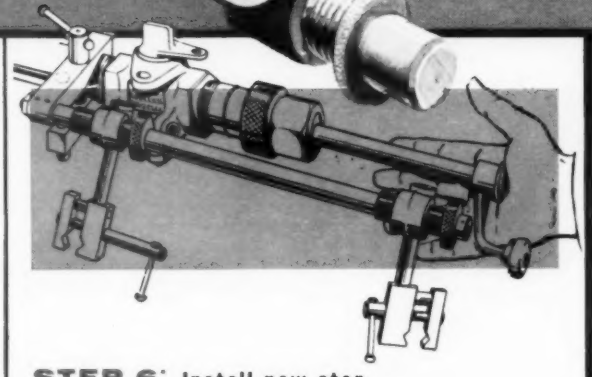
STEP 4: Remove old stop.
Release rear clamp from shaft. Slide stop and pressure chamber from shaft. Front clamp holds stopper in position.

Write for the No-Blo® Method Booklet "Safe Operating Practice." It shows how other gas installations are made in a safe manner, without escape of gas.

STEP 2: Insert and expand stopper.
Open stop and insert stopper. Tighten rear clamp on shaft and expand stopper. Slide "O" ring collar forward, exposing test hole, to test for tight stop-off.



TEP 5: Slide new stop onto shaft.
n new stop – screw pressure chamber into stop and slide on haft. Tighten rear clamp. Release front clamp.



STEP 6: Install new stop.
Screw new stop onto pipe. Release stopper and withdraw through stop. Close stop, test for leaks and remove No-Blo Stop Changer. Connect house piping and open new stop to complete installation.

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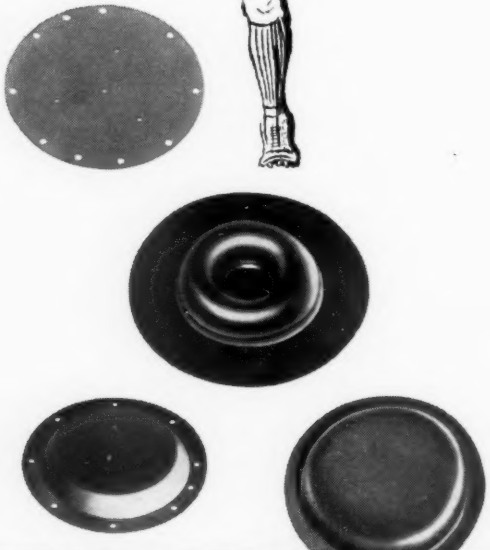

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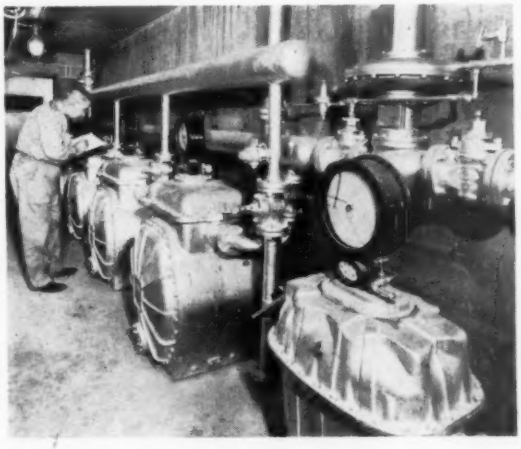
Let *flame-fast* gas serve you as it does the magnificent new Statler Hilton.

Main Kitchen — From these *flame-fast* gas ranges, ovens, deep fat fryers and broilers, many chefs and cooks turn out delicious food quickly and easily. Here the unmistakable "flame-kissed" flavor is added to Southwest Modern meals.



Gas Meter Room — The tremendous flow of *flame-fast* gas through these huge meters will economically furnish year-round air conditioning, and all other direct gas needs of the new Statler Hilton.

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TYPE 99-1
2" screwed connections, hi-tensile iron, steel or bronze body.

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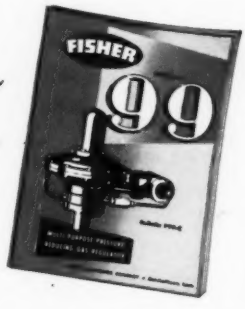

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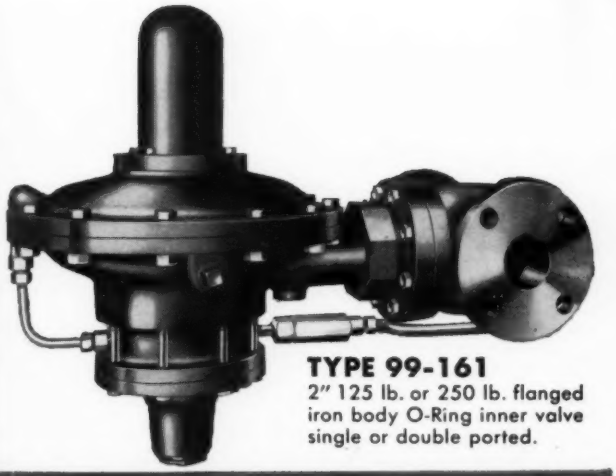

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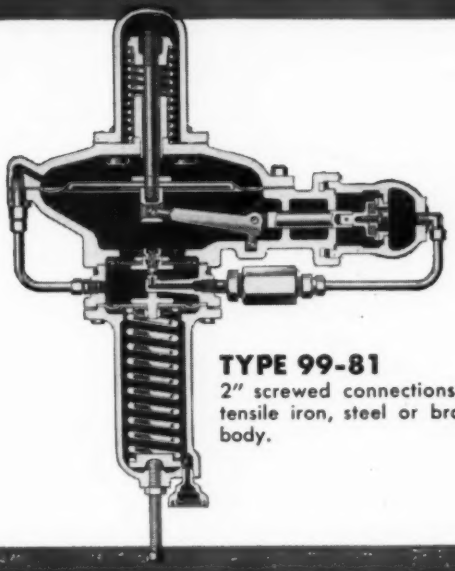

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AGJ editorial summary

To Sell Residential Gas Air Conditioning, Gas Industry Will Have To Work Harder

In this issue, on page 28, you'll find an interesting article about a survey of gas utility companies in the Southern Gas Association area regarding gas air conditioning. This survey was restricted to SGA area companies for two reasons: first, because of climatic conditions, this area represents the greatest potential market for gas air conditioning equipment; second, it seemed appropriate for this special SGA issued and SGA convention, where the topic of selling gas air conditioning will occupy a major place on the convention program.

In the course of evaluating the results of our survey, we supplemented statistics with other information gathered from industry people concerned with selling and applying gas air conditioning equipment. Several of the comments we received are worth writing down in your memo pad — and then tear out the sheet and put it under the glass on your desk or paste it on the wall above the desk.

Q. Why, we asked, has the gas industry been so slow in promoting gas operated air conditioning equipment for residential purposes?

A. True, we were told, the gas industry has been slow in promoting gas air conditioning. But — and this has been the drawback — until a few years ago, there was only one gas A/C unit available in production quantities. There wasn't any competition because there weren't several manufacturers vying for the market. And to promote a market as vast as residential air conditioning requires more than just the promotional efforts of one single gas company in its own area.

Most gas units have a slightly higher initial cost, but this disadvantage is more than overcome by the lower operating costs, compared to electrical units.

There's no question about how well gas air conditioning performs, or that it can't be sold if you have good equipment available for sale, and can install it when the sale is made.

The big problem has been engineering of new types of gas-operated air conditioning equipment. There are several concerns in the business today — but their products are still not being produced on a mass scale. As they become available to the gas utilities, you'll see more and more promotion, and sales will increase rapidly.

But you can't sell something you don't have.

Q. Aren't there a number of units available now that are quality produced?

A. Yes, there are. Performance tests, however, are still being conducted on most of these units by the gas companies who plan to sell them. The gas companies find it a "must" to study these units, suggest improvements, and make sure that the units will perform satisfactorily before placing them on the market.

Q. What are some other problems?

A. Competition from electric units, especially with the wild sales programs being conducted by dealers in many areas who are after volume sales with little or no service attached to the sale. A gas company can't do that. If we install a unit, we have to be able to service it and make sure that it works properly at all times. We have to keep our customers happy.

It is hard to compete against some of the "deals" available today — such as one firm's product, where two 1-ton or two 1½-ton electric window units are tied together and placed in the attic, with a large blower and a few short pieces of ductwork.

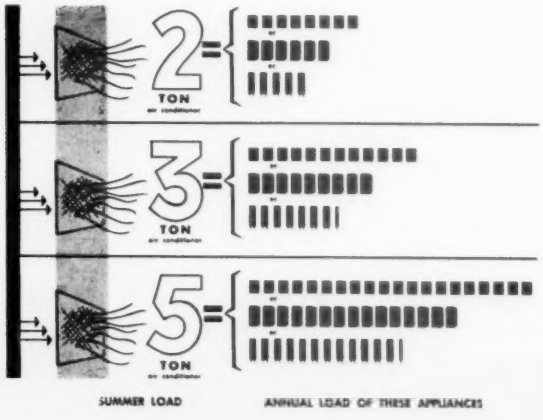
Another problem is that most people want packaged units for their homes, especially where the house has been built for several years and is already equipped with a central heating system. The need for compact, efficient, reasonably priced packaged gas air conditioning units cannot be overstressed.

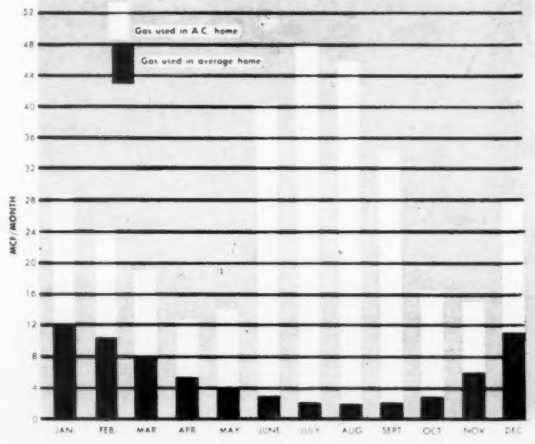
Q. What about a greater effort on the part of the gas companies to promote and sell gas air conditioning?

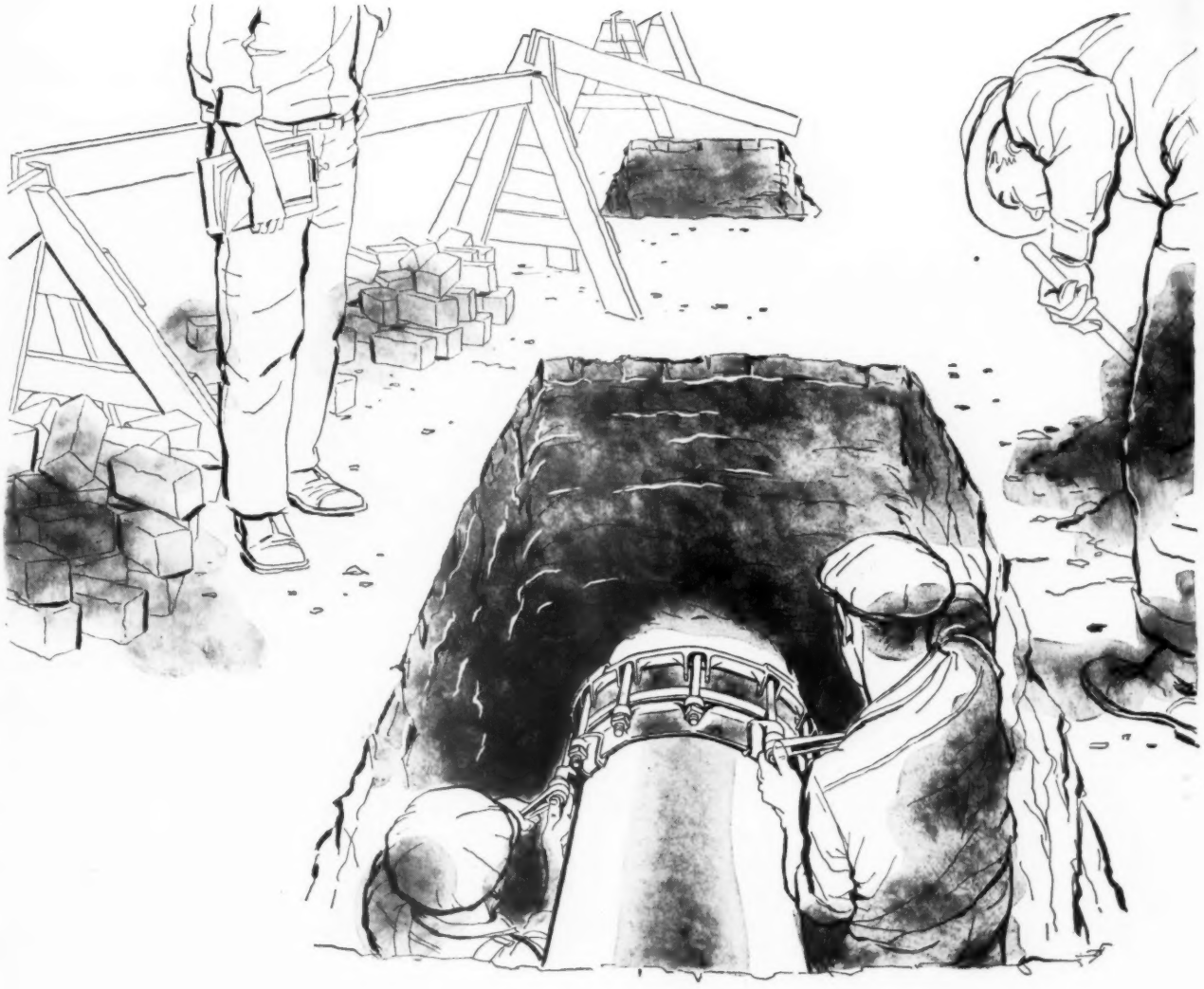
A. As one prominent gas utility sales executive put it, "a lot of gas company people have either forgotten how to sell, never knew how, or just don't care!" Selling gas apliances — and air conditioning equipment is in this category — is like selling anything else — you've got to use every possible method.

Advertise. Ring door bells. Use direct mail pieces. Get leads from servicemen and follow up with personal calls. And most important — don't let up. Selling must be a 365-day-a-year program. Eat, breathe, sleep, think selling. Only by so doing can we continue to compete effectively against other types of equipment. In fact, we could take a few pointers from our contemporaries in the electric utility industry — and the dealers and distributors of electric powered air conditioning equipment.

These are only a few of the comments received. They are important ones, however, in our judgment. There can be little doubt that gas air conditioning is a growing market and can be a profitable one for the gas utility companies. Now that there are many quality units appearing on the market — and a big pat on the back to these companies for their perseverance in producing this equipment — it's up to the utility companies to do their part and start selling!







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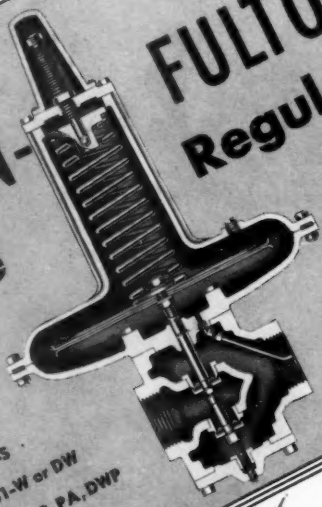

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12" diaphragm	ounces to 5 psi
8½" diaphragm	3 to 10 psi
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20 psi inlet	25000 CFH
50 psi inlet	48000 CFH

Model 461-S
Model 461-W or DW
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461-1-56

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Pittsburgh 33, Pennsylvania

The Law:

Are Companies Liable for Employee Negligence?

By Leo T. Parker
Attorney at Law

Must Be Observant

All officials and employees of gas corporations should be careful and observant to detect and remedy situations, which left unattended, will result in an adverse verdict and heavy damage liability.

This is so, particularly, because the courts are in accord with this legal rule: *"Every gas corporation employee is under duty to exercise his normal senses and intelligence and use reasonable care to avoid injury to others. Hence, where a dangerous situation arises investigation and inspection by the proper official or employee is necessary in order to avoid and eliminate future liability.*

For example, in *Golden v. National Utilities Company 201 S. W. (2d) 292,* it was shown that a gas company received a complaint from a property owner that his gas pressure was low. The company's service superintendent went to the consumer's home and adjusted the stove burners. He made no test of the condition of the service pipe in from the gas main.

Soon afterward, the property owner again complained. In response to this latter complaint the superintendent dug up eight feet of the service pipe between the sidewalk and curbing. This pipe was observed to be corroded, and unfit for use. It was removed and replaced with new pipe. The superintendent did not investigate thoroughly the condition of the remainder of the service pipe although it appeared to be serviceable. However, the superintendent made no definite tests.

Six months later the property owner noticed that the water heater would flash or puff. The property owner lighted a match, and a loud explosion occurred. The property owner was severely burned, and sued the gas company for damages.

In subsequent litigation, the property owner proved that the soil around the old pipe was a bluish gray indicating escaping gas. The injured consumer contended that the gas company was liable primarily because the superintendent had failed to exercise his "senses and intelligence" when he failed to investigate and know that the balance of the service pipe was defective after digging up eight feet of the old pipe, which was found to be defective and dangerous.

The higher court agreed with this contention and approved a jury's award of $8,000 damages, saying:

"There was a duty on appellant (gas company) to find out whether gas was escaping from other parts of the service pipes, but instead of making further examination appellant (gas company) was content to excavate and replace only eight feet of the service line."

Therefore, the gas company could have avoided the $8,000 award, plus heavy expense in defending the damage suit, if the superintendent who dug up eight feet of defective service pipe had dug up and replaced the balance of the defective service pipe.

In fact, the court clearly indicated that since the gas company's superintendent had dug up and found a portion of the service pipe defective it was his **legal duty** to dig up and replace the balance of the defective pipe.

Another angle to this case is this: If the gas company had placed the obligation and duty on the property owner to dig up and replace the defective service pipe then, under these circumstances, there could have been no liability on the gas company for injuries resulting from the explosion. However, the instant the gas company's superintendent assumed the responsibility to dig up, inspect and replace a portion of the defective service pipe, the legal duty automatically devolved on him to entirely eliminate the cause of the subsequent explosion.

For comparison, see *Wilson, 156 S. W. (2d) 1010.* Here it was disclosed that a superintendent of a gas corporation was notified by a consumer of a gas leak. The superintendent neglected to promptly turn off the gas or make an investigation and the gas exploded.

In later litigation, the higher court held the gas corporation liable and explained that it was the duty of the superintendent to either turn off the gas with reasonable promptness or investigate the consumer's complaint when notified that a leak had been discovered. In other words, the higher court held the gas company liable because the superintendent was negligent in acting immediately after receiving information of the existence of a gas leak.

And again, see *Houston Natural Gas Company v. Kluck, 154 S. W. (2d) 504.* In this case the higher court held a gas corporation liable in damages for death of a consumer, because the gas corporation's officials and employees had failed to odorize gas so that it could be detected. In other words, since the gas corporation had failed to have its gas so odorized that a person of average olfactory senses would detect leaking gas, the higher court held that such failure was negligence which was the proximate cause of an explosion and fire, and said:

"The jury found . . . that appellant (gas corporation) had failed to have its gas so odorized that a person of average olfactory senses would detect leaking gas. Failure to so odorize was negligence and that such negligence was a proximate cause of the fire which resulted in the death."

Employee Is Injured

According to a late higher court decision, an ordinary statement or "release" signed by an injured employee will not relieve a gas company from damages or compensation payment.

For instance, in *Public Utilities Corporation v. Garden, 32 S. W. (2d) 1052,* it was disclosed that a gas company employee was injured while digging a ditch in which a gas line was to be laid. The employee sued for damages.

The gas company introduced as evidence a statement signed by the employee which dealt with circumstances of his injury, and the employee in writing agreed that the gas company was not to be held liable in damages for the injury. The injured employee admitted signing the statement, but testified that he did not realize what he was signing.

Although the lower court held the gas company not liable, the higher court reversed this verdict, saying:

". . . Appellee's (employee's) testimony as to the circumstances under which it was signed was such, if believed, as to discredit the statement altogether and cause it to be disregarded by the jury."

10 Years of Post War Growth

"Shirt-Sleeves" Approach to Problems Has Helped Make SGA Successful

J. H. Collins, Sr. General Superintendent, Gas Department, New Orleans Public Service, Inc.

J. H. Collins, Sr.
President, Southern Gas Association

THE Southern Gas Association is completing a significant milestone this month. Just 10 years ago, after the close of World War II, a group of far-seeing leaders in the natural gas industry sat down at our convention in Galveston, Texas, and drew up plans for a reorganized SGA. A permanent office was established and our first full-time managing director —Robert R. Suttle — was elected.

In these 10 years, SGA has doubled its membership, doubled its budget, and far more than doubled its accomplishments.

To me, the biggest single factor in the growth and success of SGA has been our series of Round-Table Conferences. Thirty-seven times during this last year, in locations ranging from Roanoke, Virginia, to El Paso, Texas, we brought together small groups of men for informal, shirt-sleeve discussions of various aspects of their jobs. Those conferences were distributed almost equally among our five sections — Accounting, Distribution, Employee Relations, Sales and Transmission—so that we had something to offer every branch of our industry.

These meetings get right down to bedrock on the issues at hand, whether it be a new method of accounting or a study of right-of-way problems for transmission men. Wide-sweeping generalities are taboo — the information that comes out of the conferences has practical and immediate application to every man's job.

Our Round-Table chairmen — all the work is done by men from our gas company members — are impressed with the need for streamlining, so that all participants can get the most out of it in a short time. Most of our conferences last only one day, though a few are carried over through the second day.

Our SGA educational program has other facets. Our two "old reliables," which have been going on for some years, are our meter school at the University of Oklahoma and our short course in gas technology at Texas College of Arts and Industries.

We have a new baby added to this list, and in its first two years of operation it has developed into a healthy, lively youngster. This is the SGA Management Development Course, which is held for two weeks in the summer at Texas A&I College at Kingsville, in deep South Texas near the Rio Grande.

About 30 men have been chosen each year from the transmission and distribution departments of our member companies to go back to school to learn how to be better managers. The strength of any industry or any organization lies, I believe, in the capability of its "middle management" people. In many ways theirs is the hardest job of all, because they have to have all the technical know-how, plus the ability to handle and get along with people.

These men are told quite frankly that the course is not designed to groom them for higher positions. Primarily, it was set up to enable each of them to do a better management job in the position he now holds.

No "college" has more loyal "alumni" than the Management Development Course. To a man, they say they never realized so much vital information could be packed into two short weeks of study. Curtis M. Smith is the "daddy" of this course, and he's got a youngster he can be proud of. Plans are under consideration for possible expansion of the Management Development Course.

In addition to the above educational facilities, two other activities are up for consideration. The Distribution Section is investigating the possibility of establishing a distribution home study course for all distribution personnel. In addition, the Distribution Section is also surveying the member companies to learn their interest in establishing a three-day short course for service supervisors.

Other activities of SGA include a literature survey on the heat pump, the preparation of an "Expense Per Average Customer Report," the preparation of a first-line supervisory training course, and the publication of an "Accident Prevention Manual and Directory." During the past year, a motion picture and filmstrip exchange was established, and a special directors' committee was appointed to work on improvement in steel pipe. The Accident Prevention group is in the process of producing two new safety filmstrips, and the Sales Section has initiated the future publication of a data book on gas utilization in the South and Southwest.

That's a partial story of SGA's accomplishments. We are doing our work out in the field, among the men it will benefit the most. On this broad base we are doing our part to help build a more productive, more efficient natural gas industry for the South.

Behind SGA's Success Story . . .

Efforts of Many Industry Men Responsible for Achievements

An organization of the size and scope of Southern Gas Association requires the services of a great many people. Of necessity, practically all of these services, efforts, counsel and assistance are strictly voluntary — donated by the duly elected officers, directors, committee and section chairmen, and other participants in the association's activities as their part in furthering their industry.

Who are these people, what companies do they represent, and what are their jobs? On this and the following two pages, AGJ presents a pictorial "Who's Who" of the men who guide the activities of the association and who keep the wheels turning.

Through the efforts of these men — and their predecessors, SGA in the past 10 years has doubled in membership and the annual budget has also doubled. Convention attendance, which was 555 in 1946, is expected to top the 2000 mark this year. SGA activities in the past decade have been multiplied many times over — activities such as the series of round-table conferences, some 35 to 40 annually where small groups gather for intensive study of their special problems; the two annual short courses on "Gas Technology" at Texas A&I and the "Gas Appliance Servicing" short course at the University of Tulsa; a management development program and research projects.

Who's Who In SGA . . .

R. A. Puryear, Jr.
Alabama Gas Corporation
First Vice President

C. M. Smith
Tennessee Gas Transmission Co.
Second Vice President

W. G. Wiegel
Lone Star Gas Company
Treasurer

D. E. Frieden
Zenith Gas System, Inc.
Secretary

K. H. Turner
Atlanta Gas Light Company
Assistant Secretary

R. R. Suttle
Southern Gas Association
Managing Director

Who's Who In SGA . . .

Photographs of several persons were not available for this Who's Who section at presstime. We're sorry no pictures are available.

F. M. Featherstone, Jr.
Mississippi Valley Gas Company
Chairman, 1956-57 Accounting Section

W. B. Hambright
Atlanta Gas Light Company
Chairman, 1956-57 Distribution Section

W. K. Sanders
Trunkline Gas Company
Director

F. K. Macdonald
Texas Illinois Natural Gas Pipeline Co.
Chairman, Accounting Section

B. F. Worley
United Gas Corporation
Chairman, Distribution Section

D. W. Weir
Arkansas Louisiana Gas Co.
Chairman, Employee Relations

R. E. Allen
El Paso Natural Gas Co.
1956-57 Chairman, Employee Relations

J. J. Sheehan
Piedmont Natural Gas Company
Chairman, Sales Section

L. P. Thomas
Houston Natural Gas Corporation
1956-57 Chairman, Sales Section

T. S. Bacon
Lone Star Gas Company
Chairman, Transmission Section

L. C. Poindexter
United Gas Pipe Line Company
1956-57 Chairman, Transmission Section

L. A. Bickel
Lone Star Gas Company
Chairman, Convention Committee

M. S. Hitchcock
American Meter Company
1956-57 Chairman, Convention Committee

R. M. Hutchison
Houston Natural Gas Corporation
Chairman, Accident Prevention Council

E. R. Cunningham
Texas Eastern Transmission Corporation
Chairman, Advisory Council

A. H. Weyland
Arkansas Louisiana Gas Company
Vice Chairman, Advisory Council

R. W. Camp
Consolidated Gas Utilities Corporation
Director

O. W. Clark
Southern Natural Gas Company
Director

C. E. Cloud
MidSouth Gas Company
Director

J. A. Davis
Empire Southern Gas Company
Director

B. G. Duncan
Piedmont Natural Gas Co., Inc.
Director

L. H. Ernst
Caloric Appliance Corporation
Director

E. G. Hotze
Clark Bros. Inc.
Director

D. M. Mayne
Servel Inc.
Director

S. V. O'Lenic
Chattanooga Gas Company
Director

C. K. Oxford
Gas Light Company of Columbus
Director

C. L. Perkins
El Paso Natural Gas Company
Director

C. B. Reinschmidt
South Atlantic Gas Company
Director

H. C. Webb
Oklahoma Natural Gas Company
Director

J. A. Wilson
United Gas Corporation
Director

SGA Friendship Hour

For two years in a row the SGA Friendship Hour has either been next to or on the water — specifically the Shamrock Hotel pool in '54 and the Mississippi River steamboat trip in '55.

But this year — 1956 — it will be a landlubber affair. Access to the Gulf Stream will be available (water faucets are conveniently located throughout the new Statler-Hilton) but otherwise, it will be a strictly dry-land affair, taking place in the Statler's Grand Ballroom.

What's on the program for this year's entertainment? That's a surprise, says Don Mayne, Dallas Servel representative who's arranged the program. But he guarantees that it'll be "most enjoyable and with a change of pace."

★ ★ ★

There is one big change this year in the Friendship Hour, in case you didn't notice: The affair is being held on Monday night instead of Tuesday night.

Good reasoning behind this change. For many of those attending the SGA meeting, they will be seeing each other for the first time. Setting the "get acquainted" hour up a day gives everyone an additional day during the meeting to get better acquainted.

The Friendship Hour was planned as a means of helping folks to get acquainted. With two days to follow up on introductions, it should become a more valuable and effective "mixer".

★ ★ ★

As is customary at SGA meetings, the Friendship Hour hosts are the manufacturers and service organizations associated with SGA. Giving them a bit of recognition, their names are noted on this page.

Hosts At the SGA Friendship Hour

American Air Filter Co., Inc.
American Cast Iron Pipe Co.
American Gas Journal
American Meter Co., Inc.
AmeriVent, Inc.

Barrett div., Allied Chem. & Dye Corp.
Bryant div., Carrier Corp.

Caloric Appliance Corp.
Cameron Iron Works, Inc.
John H. Carter Co.
Catlett Engineers, Inc.
Chaplin-Fulton Mfg. Co.
Chattanooga Royal Co., div. Chattanooga Impl. & Mfg. Co.
Clark Bros Co., div. Dresser Operations, Inc.
Cleaner Pipelines Co.
Cleveland Heater Co.
Cleveland Trencher Co.
Coleman Co., Inc.
Combustion Engineering, Inc., Home Equipment div.
Continental Supply Co., div. Youngstown Sheet and Tube Co.
C. Lee Cook Mfg. Co.
Cooper-Bessemer Corp.
Cribben and Sexton Co.
M. J. Crose Mfg. Co., Inc.
Crosley Bendix Home Appliances

Daniel Orifice Fitting Co., Inc.
Darling Valve & Mfg. Co.
Davison Chem. Co., div. W. R. Grace & Co.
Day & Night div., Carrier Corp.
Dearborn Chem. Co.
Dearborn Stove Co.
DeLaval Steam Turbine Co.
Detroit Controls Corp.
Dixie Products, Inc.
Double Seal Ring Co.
Dresser Engineering Co.
Dresser Mfg. div.

Ebasco Services, Inc.
Eggelhof Engineers, Inc.
Empire Stove Co.
Esso Standard Oil Co.

F. J. Evans Engineering Co.
Fisher Governor Co.
Florence Stove Co.
Ford, Bacon & Davis Const. Corp.
Foxboro Co.
France Packing Co.

Garlock Packing Co.
General Controls Co.
General Electric Co., turbine div.
E. F. Griffiths Co.
Grove Regulator Co.
Gulf Oil Corp., New Orleans sales div.

Hardwick Stove Co., Inc.
Hays Mfg. Co.
Heath Survey Consultants, Inc.
M. M. Hedges Mfg. Co., Inc.
Hill, Hubbell and Co., div General Paint Corp.
Holcombe Co.

Industrial X-Ray Engineers
Ingersoll-Rand Co.

Johns-Manville Sales Corp.

Keith-Kote, Inc.
K-F-B Const. Corp.
Koppers Co., Inc., tar products div.

Ladish Co.
La-Miss. Pipe Line Const. Corp.
Lattimer-Stevens Co.
Lennox Industries, Inc.
L.O.F. Glass Fibers Co.
Lone Star Steel Co.
Lubricosos Specialties Mfg. Co.
Lynn McGuffey Co.

Magic Chef, Inc.
Maintenance Engineering Corp.
Massey Machine Co.
Mavor-Kelly Co.
McCabe-Powers Auto Body Co.
Metalbestos div., William Wallace Co.
Milwaukee Gas Specialty Co.
Minneapolis-Honeywell Regulator Co.
Modern Welding Co.
Motorola Communications & Electronics, Inc.
Mueller Co.

Natural Gas Odorizing Co., Inc.
J. P. Neill & Co.
Norton McMurray Mfg. Co.

Ohio Foundry and Mfg. Co.
Oil Well Supply div., United States Steel Corp.
O'Keefe and Merritt Co.
Oklahoma Pipe Line Constructors

Payne div., Carrier Corp.
Peerless Mfg. Corp.
Pipe Line Service Corp.
Pittsburgh Coke & Chem. Co.
Pittsburgh Testing Laboratory
Protecto Wrap Co.

R. A. Ransom
Ready-Power Co.
Republic Steel Corp.
Reynolds Gas Regulator Co.
Rheem Mfg. Co.
Robertshaw-Fulton Controls Co.
E. A. Robinson Supply Co.
Rockwell Mfg. Co.
Geo. D. Roper Corp.
Rosson-Richards Co.
Ruud Mfg. Co.

Safety Gas Main Stopper Co.
Sellers Engineering Co.
Servel, Inc.
M. B. Skinner Co.
A. O. Smith Corp.
Sonner Burner Co.
Southern Cross Foresters
Sprague Meter Co.
Stone & Webster Service Corp.
Superior Iron Works & Supply Co., Inc.

Tappan Stove Co.
Taylor Forge & Pipe Works
Temco, Inc.
Tube Turns, div., National Cylinder Gas Co.
Tulsa Pipe Coating Co.

United Pipe Utility Suppliers, Inc.
Universal Controls Corp.

Vinson Supply Co.
Vulcan Rubber Products, Inc.

Walworth Co.
Weaks Supply Co., Ltd.
Webster Engineering Co.
Westcott & Greis, Inc.
Western-Holly Appliance Corp.
Whirlpool-Seeger Corp.
White-Rodgers Electric Co.
T. D. Williamson, Inc.
W-K-M Mfg. Co., Inc.
John Wood Co.
Woodward Governor Co.
Worthington Corp.

H. Zinder & Associates, Inc.

SGA Sections, Committees Had Busy Year

The value of an association is in the help it provides its members. SGA gets results "in the field" through specialized conferences that detail the problems of varying interests and groups of activities that make up the gas industry. During 1955-56, the five sections of SGA — Accounting, Distribution, Employee Relations, Sales, and Transmission — sponsored some 40 conferences and round-table meetings. Here are reports from various section chairmen on their accomplishments.

Distribution Section

— B. F. Worley

Many important activities have been underway in the Distribution Section during the past year, including seven conferences and a number of projects.

Highlights of the year were the conferences, as follows:

Distribution Operations and Maintenance —Eastern Area conference, attended by 16 delegates representing eight member companies, was held August 15 in Chattanooga, Tennessee, under the sponsorship of O. F. Reynolds.

Conference time was devoted to leakage detection and repair, the use of mechanical equipment, upgrading of operating personnel with training courses, procedures for handling gas outages and other timely subjects relating to the general field of distribution operations and maintenance.

Distribution Operations and Maintenance — Western Area Conference, was attended by 29 delegates representing 13 member companies. This conference was held August 26 in Shreveport under the sponsorship of B. L. Bratton.

Subjects discussed included: dispatching of service work, the proper control of distribution pressures, gas outage procedures, leakage detection and reduction, use of mechanical equipment for facilitating maintenance work, control or elimination of dust in distribution systems, periodic inspection of service lines, yard lines and house piping, insulating devices, controlling and reducing the amount of paper work performed by supervisors, work on customers' premises, and provisions of the new AGA B-31.1 8-1955 Code.

Aid Conditioning Service and Installation Conference was held in Shreveport, Louisiana, October 6-7, 1955, and was sponsored by I. E. Rowe of the United Gas Corporation. Fifty-four delegates attended, representing 22 member companies.

The two-day conference, attended by gas air conditioning design engineers and supervisors of employees who handle installation, maintenance and service work, was devoted to the discussion of gas air conditioning engineering, design, installation, maintenance and services

A considerable portion of each day was devoted to presentations by factory engineering representatives of air conditioning equipment manufacturers.

Distribution Design and Construction — Eastern Area conference was held in Birmingham, Alabama, August 28 under the sponsorship of Charles B. Gamble, Jr., of the Alabama Gas Corporation. Some 28 delegates representing 10 member companies met to discuss such subjects as the provisions of the ASA Code applicable to the design and construction of mains, services, district regulator and customer meter and regulator installations. Other subjects included the installation and maintenance of cathodic protection facilities, mechanization of construction crews, the use of medium wall line pipe and a review of construction costs and construction contracts of member companies.

Distribution Design and Construction — Western Area conference, held October 23 in Little Rock, Arkansas, was attended by 23 delegates representing 13 member companies under the sponsorship of James L. Walker of the Arkansas Western Gas Company.

Discussion centered around use of network calculators for designing distribution systems, pipe coating and wrapping specifications, use of light weight pipe, cathodic protection, use of pressure fittings for making tie-ins, methods to reduce construction costs, and provisions of the ASA Code.

Domestic Meters and Regulators — Eastern Area, was the subject of the conference held January 27 in Jackson, Mississippi, under the sponsorship of Tom F. Larche of the Mississippi Valley Gas Company.

The 20 delegates representing eight member companies discussed specifications for the purchase of new domestic meters and service type regulators, proper repair methods, mechanization of shops, cleaning and painting methods and specifications, experiences with the use of synthetic diaphragms, meter proving practices, including slow light tests, and experiences with the use of differential draft gages, meter and regulator installation and sizing practices.

Distribution Management Conference was held in New Orleans March 1-2, under sponsorship of W. B. Hambright of Atlanta Gas Light Company.

Total of 28 delegates from 20 member companies attended the two-day meeting to hear progress reports on 1955-56 activities, a report on AGA distribution activities by J. Stanford Setchell, secretary of the AGA operating section, planning of 1956-57 activities, and a review of the Distribution Section's convention program.

Other activities. Work on the SGA Emergency Assistance Plan was completed during the year and a directory issued to member companies.

On recommendation from the Short Course Administrative Committee, the annual Gas Appliance Short Course is to be discontinued due to a decline in attendance occasioned by many member companies establishing their own servicemen's training courses. Consideration is being given to the establishment of an annual Service Supervisors Short Course as a replacement.

A Natural Gas Distribution home study course is also being studied.

Accounting Section

— F. K. Macdonald

A series of six round table meetings were held during 1955-56 to help all accountants with problems relating to production, transmission, distribution and property accounting.

Property Accounting for all types of companies was the subject of the first round table meeting held in Tulsa, July 8. The morning session covered Plant common to all types of companies and the afternoon session was divided into two groups, one on Production and Transmission Plant and the other on Distribution Plant. Some 37 representatives of 22 member companies attended the meeting, sponsored by R. R. Allen of Oklahoma Natural Gas Company.

Distribution Accounting was the subject of the second meeting held in Shreveport, August 26 under the sponsorship of Lee Hunt of Arkansas Louisiana Gas Company. More than 30 representatives of 16 member companies attended.

Customer Accounting was covered in two September 16 regional meetings. The **Eastern** area meeting was held in Charlotte, North Carolina, under the sponsorship of W. G. Armstrong of Piedmont Natural Gas Company and the **Western** area meeting was held in Houston, under the sponsorship of W. F. Hinds of Houston Natural Gas Corporation. Twenty-eight of 11 member companies attended the Eastern area meeting while 31 representing 15 companies attended the Western area meeting.

Production and Transmission Accounting was the subject of the October 8 meeting held in El Paso under the sponsorship of W. B. Warren of El Paso Natural Gas Company. Fourteen companies were represented at this meeting.

The Accounting Management group formulated plans for the next association year at its meeting February 16-17 in New Orleans under the sponsorship of the incoming chairman, Francis M. Featherstone, Jr.

Sales Section

— J. J. Sheehan

Activity in the Southern Gas Association's Sales Section reached new peaks during the 1955-56 promotional year — new peaks in attendance and new peaks in interest, a very heartening development.

Highly successful during the year have been the eight Round-Table conferences whereby members can swap information and ideas. No better method of communication between members has yet been devised, this section believes. Comments from those attending the meetings on the value of these conferences on their educational and informative value continues to justify the time and expense of having member company personnel attend these conferences.

The full program of conferences in the 1955-56 year include the following:

Sales Executives Conference, New Orleans, Louisiana, February 24-25, 1955, J. J. Sheehan, Piedmont Natural Gas Company, Inc., sponsor.

Commercial Sales Round-Table, Birmingham, Alabama, July 22, 1955. B. G. Bell, Alabama Gas Corporation, sponsor.

Home Service Conference, Atlanta, Georgia, August 11-12, 1955, Mrs. Elizabeth L. Headley, Savannah Gas Company, sponsor.

Advertising Round-Table, New Orleans, Louisiana, September 9, 1955, Mrs. Alta Ewalt Evans, Southern Union Gas Company, sponsor.

Residential Sales Round-Table — West, Houston, Texas, September 16, 1955, L. W. Little, United Gas Corporation, sponsor.

Residential Sales Round-Table — East, Roanoke, Virginia, September 19, 1955, E. V. Bowyer, Roanoke Gas Company, sponsor.

Air Conditioning Sales Round-Table — West, Houston, Texas, January 20, 1956, W. A. Collins, Lone Star Gas Company, sponsor.

Air Conditioning Sales Round-Table — East, Nashville, Tennessee, February 3, 1956, W. D. Myers, Nashville Gas Company, sponsor.

Transmsision Section

—T. S. Bacon

Principal activities of the Transmission Section during the past year involved 11 round-table conferences on various phases of Transmission Section activities. All of these round-table conferences were well attended and have proven very constructive.

A Conference of Chief Draftsmen was held the past year, the first under SGA sponsorship. The drafting operations required in transmission activities require in the aggregate the expenditure of many man-hours and many dollars. This informal meeting of chief draftsmen resulted in the exchange of ideas about operating procedures and personnel that appears to be extremely constructive. This conference will be repeated next year.

A Conference on Electronic Computers also was the first of its type to be sponsored by SGA. Problems of effective and economic use of electronic computers for engineering computations were discussed at length under the very capable sponsorship of C. C. Homan, Jr., of El Paso Natural Gas Company, who has pioneered in this application of the computers and who is exceptionally well qualified to discuss this complex and highly technical subject. Results of the conference were very constructive and have resulted in increased use of computers in transmission activities. This conference will also be repeated in the coming year.

The remaining nine conferences were well attended and proved stimulating in the exchange of ideas.

These conferences, date, meeting place, and sponsor, were as follows:

Transmission Management Conference, March 7, 1955, El Paso, Texas. T. S. Bacon, Lone Star Gas, sponsor.

Use of Electronic Computers by Engineering Personnel, April 14-15, 1955, El Paso, Texas, C. C. Homan, Jr., El Paso Natural Gas Company, sponsor.

Chief Draftsmen Round-Table, July 29, 1955, Houston, Texas, D. W. Bright, Lone Star Gas, sponsor.

Dispatchers' Round Table, July 29, 1955, Houston, Texas, G. E. Foulke, Gulf Interstate Gas Company, sponsor.

Pipe Line Operations and Maintenance Round Table, August 19, 1955,

Who's Who in SGA's 1956-57 Section Committees

Accounting Section

F. M. Featherstone, Jr., *Chairman*, Mississippi Valley Gas Company, Jackson, Mississippi.

Luke V. Patrick, *Vice Chairman*, Transcontinental Gas Pipe Line Corporation, Houston, Texas.

Fred K. Macdonald, *Immediate Past Chairman*, Texas Illinois Natural Gas Pipe Line Company, Chicago, Illinois.

R. L. Hinch, *Past Chairman*, Nashville Gas Company, Nashville.

Distribution Section

W. B. Hambright, *Chairman*, Atlanta Gas Light Company, Atlanta, Georgia.

S. V. O'Lenic, *Vice Chairman*, Chattanooga Gas Company, Chattanooga, Tennessee.

B. F. Worley, *Immediate Past Chairman*, United Gas Corporation, Shreveport, Louisiana.

J. M. Averett, *Past Chairman*, Gas Light Company of Columbus, Georgia.

Employee Relations Section

Ralph E. Allen, *Chairman*, El Paso Natural Gas Company, El Paso.

D. A. Hardesty, *Vice Chairman*, Texas Illinois Natural Gas Pipe Line Company, Chicago, Illinois.

D. W. Weir, *Immediate Past Chairman*, Arkansas Louisiana Gas Company, Shreveport, Louisiana.

V. E. Rasch, *Past Chairman*, United Gas Corporation, Shreveport, Louisiana.

Sales Section

L. Proctor Thomas, *Chairman*, Houston Natural Gas Corporation, Houston, Texas.

R. P. Hill, *Vice Chairman*, Mid-South Gas Company, Little Rock.

J. J. Sheehan, *Immediate Past Chairman*, Piedmont Natural Gas Company, Inc., Charlotte, North Carolina.

J. H. Chenery, *Past Chairman*, Alabama Gas Corporation, Birmingham, Alabama.

Transmission Section

L. C. Poindexter, *Chairman*, United Gas Pipe Line Company, Shreveport, Louisiana.

S. Orlofsky, *Vice Chairman*, Gulf Interstate Gas Company, Houston.

Thomas S. Bacon, *Immediate Past Chairman*, Lone Star Gas Company, Dallas, Texas.

E. Clyde McGraw, *Past Chairman*, Transcontinental Gas Pipe Line Corporation, Houston, Texas.

Dallas, Texas, J. J. Corrigan, Transcontinental Gas Pipe Line Corporation, sponsor.

Natural Gas Gathering and Processing Round Table, August 19, 1955, Dallas, Texas, A. J. Miller, Phillips Petroleum Company, sponsor.

Pipe Line Chief Engineers Round Table, August 19, 1955, Dallas, Texas, L. N. Brown, Southern Natural Gas Company, sponsor.

Compressor Station Operations Round Table, September 30, 1955, Oklahoma City, Rex Campbell, Michigan-Wisconsin Pipe Line Company, sponsor.

Gas Pipe Line Right-of-Way Round Table, October 7, 1955, Shreveport, Louisiana, J. L. Collins, Texas-Illinois Natural Gas Company, sponsor.

Natural Gas Drilling and Production Round Table, November 18, 1955, Houston, Texas, J. E. Johnston, Oklahoma Natural Gas Company, sponsor.

Transmission Management Conference (Fall), November 18, 1955, Houston, Texas, T. S. Bacon, Lone Star Gas Company, sponsor.

Employee Relations Section — Don Weir

The Employee Relations Section held three meetings during 1955-56 and scheduled two meetings for its effective sub-section, the Accident Prevention Council.

Initial meeting of the Employee Relations Section was held in Birmingham, Alabama, July 22. Attending were 33 representatives of 24 member companies. Professor W. H. Watson of the University of Texas reviewed the progress of the project on "Supervisory Training for First Line Supervisors," which is being conducted under the section's sponsorship. Lyle Conway discussed the welfare program of United Gas. Other subjects discussed included executive training courses, wage and salary changes, the guaranteed annual wage and various fringe benefits.

Second round table conference was held in Oklahoma City on September 30 with 31 representatives from 24 member companies attending. Curtis M. Smith gave a detailed report on the SGA's "Middle Management Course" at Texas A&I, Kingsville, Texas, which SGA contemplates making into a permanent project. Also discussed was Tennessee Gas Transmission Company's major medical plan.

The third conference was held in Houston on January 20 with 45 representatives from 33 companies attending. A report on the "Insurance Benefits Survey" conducted by Harold Taylor, SGA, and Armond Harris, AGA, was presented and overall industry trends were discussed. Other topics discussed included leave policies, housing and tax rules.

Pulsation Research Council — E. N. Henderson

Among the accomplishments of the Pulsation Research Council during the past year has been the publication of a brochure, "Pulsation Suppression and Control," describing the accomplishments to date of the research program underway at Southwest Research Institute and sponsored by 16 SGA member companies and four compressor manufacturers.

Additional research is planned for the coming year to extend analog design methods to more complicated systems of piping layout.

Accident Prevention Council — R. M. Hutchison

Highlights of the accident prevention council's work during the year were two round-table meetings. The first meeting was held in Tulsa, Oklahoma, July 8, 1955, with 17 delegates representing 14 companies in attendance. Sponsor was Vance Smith of Oklahoma Natural Gas Company.

The round-table meeting in New Orleans, January 26, 1056, was under sponsorship of Tony Guell, New Orleans Public Service, with 33 delegates from 14 companies attending.

Council projects completed during the year included issuance of the annual Accident Record analysis of member companies for 1954, and issuance of 12 certificates to SGA member companies for Employee Safety Achievement.

Projects currently underway include production of a strip film on "Protection of the Public" and one on "Safety in a Gas Compressor Station," by Texas Illinois Natural Gas Pipe Line Company. Data on safety films for a film exchange between member companies is being compiled as another project. Also underway is the preparation of a new Accident Prevention Personnel Roster of member companies.

Here's a roundup on . . .

Residential Gas Air Conditioning Equipment

Four makes of residential gas air conditioners are now available or in final testing stages; on their success the gas industry is pinning its hopes for building summer loads and increasing its market

RESIDENTIAL gas air conditioners are infants to the industry, compared with other gas-fueled appliances in the home. But it's on these "infants" that the gas industry is pinning its hopes for building a larger market and increasing summer loads.

Four known brands of gas air conditioners are being produced by firms that are aiming toward the residential field. The oldest, of course, is the Servel absorption unit, produced by Servel, Inc., of Evansville, Indiana. Gas engine driven summer air conditioners are being produced by three firms. They are the Coleman Gas Motor Air Conditioner by Coleman Company, Inc., Wichita, Kansas; the Cobaire by Cobell Industries, Inc., of Fort Worth, Texas; and the Weatherbuster by Wood Electric Company, Inc., of Camden, Arkansas.

Basically, the engine driven air conditioners operate much on the same order. The units consist of an engine modified to burn natural or LP-gas. Engine modification consists of high compression heads, gas carburetion equipment, special long-life spark plugs and one has a shielded ignition system. All have large oil storage reservoirs.

Specification sheets of each unit give a closer look at the individual operation of the three air conditioners.

Cobaire Units

The Cobaire unit is produced in sizes of 3 and 5-tons and is powered by International Harvester model LQ-1 engines. The bore and stroke of the engine is 2⅝ by 2¾-in. with a piston displacement of 59.5 cu in. Maximum power of the engine is 13.9 brake horsepower with a nominal speed of 2500 rpm. Gas consumption is 18 cu ft per hr per ton of refrigeration.

Factory modifications of the motor include the use of stellite valves and seats, a high compression head, airplane spark plugs, shielded ignition and ventilated tappet chamber.

The unit uses a Copeland model 4-A-1 compressor. Bore and stroke is 1⅞ by 1-in. and the piston displacement is 11.04 cu in. The compressor operates at 1800 rpm on the 3-ton unit and 2100 rpm on the 5-ton unit. The 3-ton unit uses Freon 12 as a refrigerant and the 5-ton uses Freon 22.

The condenser has a surface of 12 sq ft of prime surface copper tubing per ton of refrigeration. A "tubulator" provides water spray on the condenser surface. Bleed-off of 1.5 gal per hr for each ton of refrigeration is automatic and an automatic float valve controls the make-up water supply.

When rotating, the wheels of the turbulator, a patented device, produce a heavy fog in the condenser, says the manufacturer. The "aqua-fog" evaporative condenser condenses the refrigerant at lower than usual head pressures by means of forced draft air flow across the heat exchange surface and the spray action from the turbulator.

When the engine has attained a speed of 800 rpm, the dry type centrifugal Hillard clutch engages, bringing the 4-cylinder compressor into action. A special starting motor equipped with chain drive and over-riding clutch is said to eliminate objectionable noise when the accoustically treated panels are in place.

Oil is supplied as needed. A full season's requirement of 10 quarts is contained within the vacuum feed reservoir. Exhaust noise is absorbed by a Maxim-designed silencer buried below grade. Engine coolant is circulated through a closed system evaporatively cooled in the condenser.

Cobaire's engine compressor and evaporative condenser are so installed that the unit makes an L-shape. The compressor forms the top of the L and is 48-in. long, 26-in. wide and 28-in. high. The condenser adds the bottom part to the L and is 24-in. wide, 44-in. long and 28-in. high. Height of the 5-ton is 33 in. Otherwise the dimensions are the same as the 3-ton.

Shipping weight of the 3-ton totals 1011 lb and the 5-ton weighs 1127 lb. This includes the condenser, engine compressor and accessories.

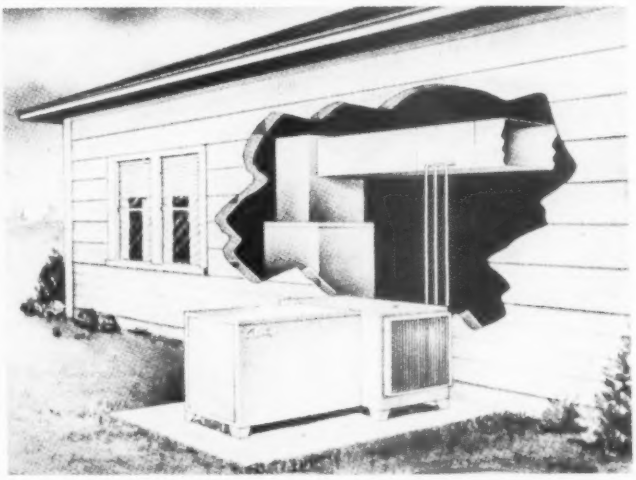
Coleman Units

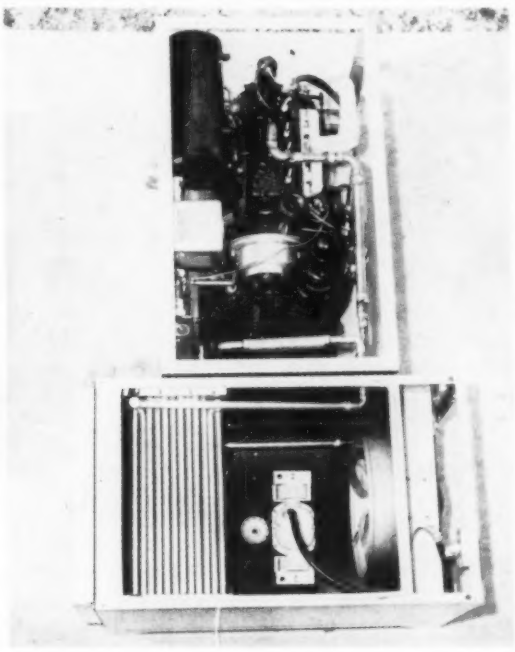
Coleman also produces 3 and 5-ton gas engine driven air conditioners. Specifications list the nominal speed of the 3-ton unit's motor at 2000 rpm and speed of the 5-ton unit at 2400 rpm. At operating speed the engine of the 3-ton has a rating of 10.5 BHP while the 5-ton is rated 12 BHP. Approximate natural gas consumption is listed at 75 and 105 cu ft an hour for the 3 and 5-ton units, respectively. Propane consumption is aproximately .85 gal an hour on the small unit and 1.19 gal an hour on the larger unit.

The Onan air cooled engine is 4-cycle, horizontally opposed, with two cylinders. Bore and stroke is 3¼ by 3-in. Piston displacement is 49.8 cu in. and it has a compression ratio of 7.3:1 on both units. A gear pump lubricates the engine. Both sizes of the units contain a 9-gal oil reservoir for SAE 30 detergent oil.

Compressor speeds are 2000 rpm for the 3-ton and 2400 for the 5-ton. The oil charge is 32 ounce, 150 viscosity refrigerant oil. A four-cylinder V-type, the compressor has a bore and stroke of 1⅞ by 1-in. Piston displacement is 11.04 cu in. The compressor is driven by direct connection to the engine through a flexible coupling.

Coleman has an air cooled-wetbulb type condenser with water consumption listed at 8 gal per minute for the 3-ton and 12 gal per minute for the 5-ton. The 3-ton unit has an air volume of 1200 cu ft a minute while the larger companion unit has an air volume of 1500 cu ft a minute. The gas driven motor drives the fan for the condenser at speeds of 2000 and 2400 rpm, respectively, for the small and larger size air conditioners.





Cobaire gas-engine driven compressor unit is located on concrete slab adjacent to building, evaporator is installed in main trunk of duct system inside. At right is view of engine-compressor-condenser unit. At bottom can be seen the turbolator unit that sprays water into forced air stream passing over condenser coils for speeded-up heat transfer.

Coleman units operate with a chiller system that has a permanently lubricated pump bearing. The Freon chills the water and the water is subsequently piped into the house. Water volume of the 3-ton chiller is 1.75 gal; for the 5-ton, 2 gal. The 3-ton chiller system has a nominal pump speed of 2180 rpm and the 5-ton, 2600 rpm. Head available at the unit outlet is 25 ft at 9 gal per minute and 31 ft at 15 gal per minute for the large and small air conditioners.

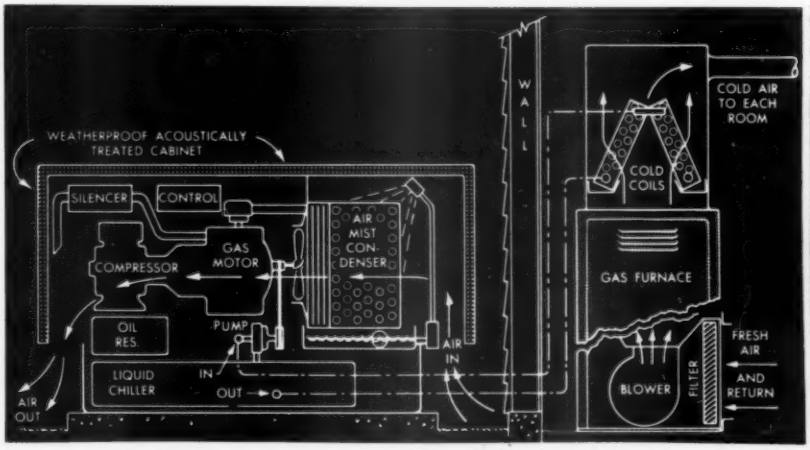
The chilled liquid may be water with a zero degree permanent-type antifreeze solution.

Refrigerants in the Coleman units are Freon 12 and 22 with a refrigerant charge of 23 and 28 lb. The small figures, of course, apply to the 3-ton unit and the large numbers to the 5-ton.

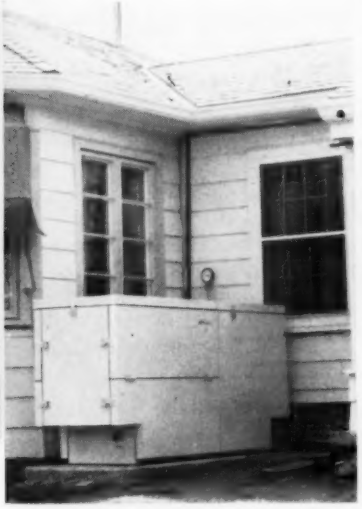
The 3-ton Coleman unit weighs 1260 lb and the 5-ton, 1310 lb. Both units are uniform in size, 90.5-in. long, 29-in. wide and 41.5 in. high.

Weatherbuster Units

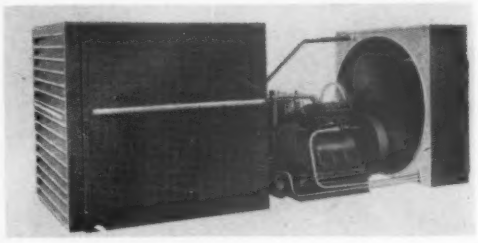
A look at Wood's Weatherbuster reveals this firm produces three models, 3-ton, 5-ton and 7.5-ton in size. Engines of the three units operate at the same speed, 1400 rpm. Compressor



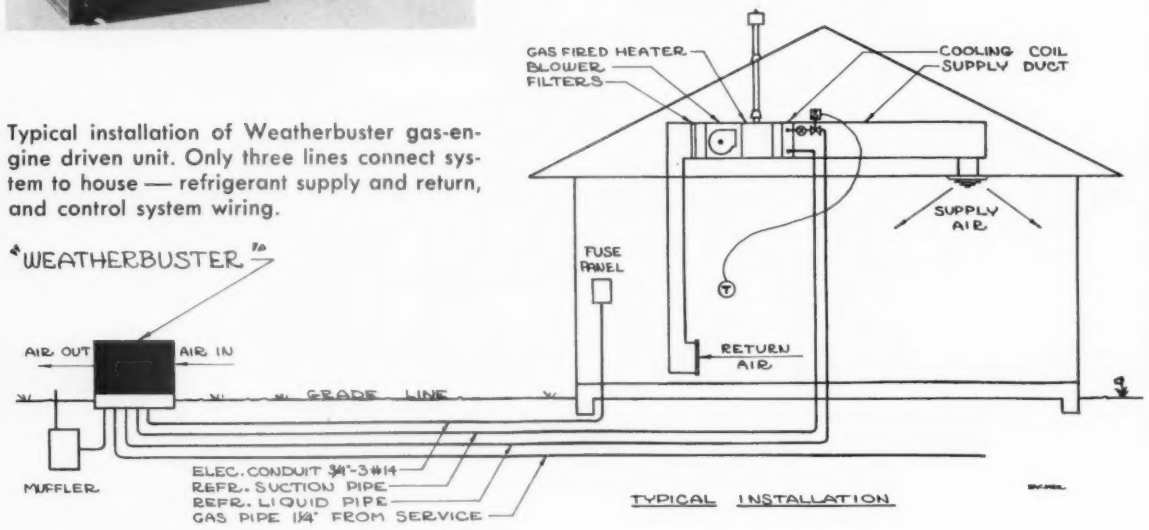
Major components and operation of Coleman gas-engine driven unit. Refrigerant circuit is self-contained. Chilled liquid lines, supply and return, are only connections between remote unit and air cooling coil inside house. Air-cooling coil is inverted-V installed in furnace plenum. A separate unit with its own blower and connection to house piping system can be installed.



Coleman unit in place. Remote unit is acoustically treated with 2½-in. of soundproof insulation. Panels can be completely stripped for service in less than two minutes, says manufacturer.



Weatherbuster unit has very low sound level, obtained by using slow speed equipment, burying exhaust barrel in ground and using it as muffler, and sound insulation of cabinet and louvre. Exploded view, left, shows simplicity of design.



Typical installation of Weatherbuster gas-engine driven unit. Only three lines connect system to house — refrigerant supply and return, and control system wiring.

speeds also are the same on each of the three units, 700 rpm, while the nominal fan speed in each case is 500 rpm.

Specifications list the fuel consumption rate at 90 cu ft of natural gas hourly for the 3-ton, 100 cu ft hourly for the 5-ton and 110 cu ft hourly for the 7.5-ton.

The Weatherbuster has a V-belt drive connecting the engine and compressor. The unit's engine is a standard Continental water cooled internal combustion engine with natural gas carburetion, governor, magneto ignition, oil filter, oil pump, water pump and line voltage starter.

An open type, slow speed reciprocating, refrigeration compressor is contained on the unit. The compressor has a shaft seal, oil sight glass, shut-off valves and flywheel.

For the condenser, there is a slow speed propeller fan assembly with pillow blocks, shaft, pulley and adjustable fan pedestal. The refrigerant receiver is standard steel.

The air cooled refrigerant condenser coil and the engine radiator are fabricated of copper tubes with aluminum fins bonded to the tubes' surface.

To deaden sound, the exhaust muffler is buried 24-in. below grade. A pipe extends from the exhaust manifold of the engine to the muffler. A tail pipe on the muffler discharges the exhaust gases to the atmosphere. Refrigerant pipings, the electrical conduit and the gas line are extended 18 in. below grade from the house to the engine unit.

Each model of the Weatherbuster graduates in weight and size according to tonnage. The 3-ton weighs 1200 lb, has a length of 60-in., width of 50-in. and is 36-in. high. The 5-ton weighs 1500 lb, is 64-in. long, 50-in. wide and 42-in. high. The 7.5-ton weighs 1710 lb, is 66-in. long, 50-in. wide and 48-in. high.

Servel Units

Moving to the absorption-type equipment, Servel produces four models primarily designed for residential use and small businesses. The units are "all-year" air conditioners.

At full capacity, gas input for refrigeration by the Servel 2-ton unit is 45,000 Btu hourly and at delivered capacity, full input is 24.000 Btu. For heating the gas input at full capacity is 90.000 Btu and at delivered capacity, full input is 72,000 Btu hourly. Pressure drop of the condensing water circuit, at 4.5 gal per minute is 1.1 psi.

The blower for the unit has a rated air quantity of 800 cfm for the heating and cooling cycle and a ¼-hp motor is used. A ⅓-hp motor is optional when a greater quantity of air than the rated quantity is required. The units are equipped with a by-pass and can circulate up to 1000 cfm. Air volume across the cooling coil is not to exceed 900 cfm. A two-inch thick filter is used. The filter is 20 by 25-in. in size. Net weight of the unit is 890 lb.

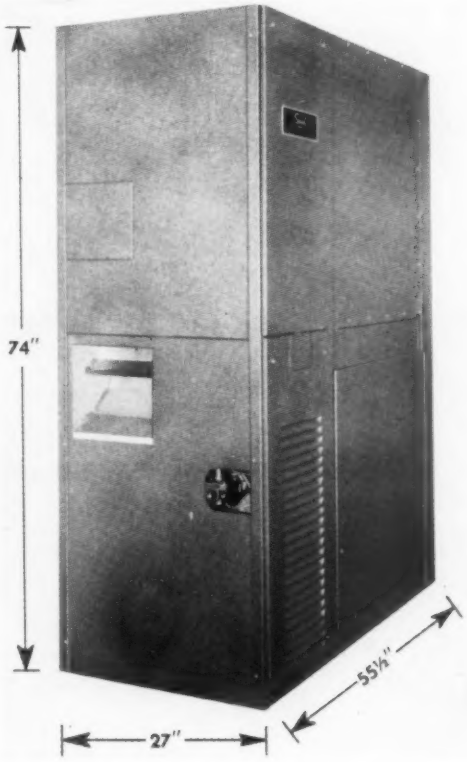
The evaporative water cooler for the unit evaporates water at 6 to 9 gal per hour with a bleed-off of 7 gal per hour. Total make-up water required is 13 to 16 gal per hour. Normal free air delivery is 900 cfm and the minimum allowable air delivery is 850 cfm.

The evaporative water cooler is 33-in. long, 41⅝-in. wide and 82½-in. high. Net weight is 795 lb.

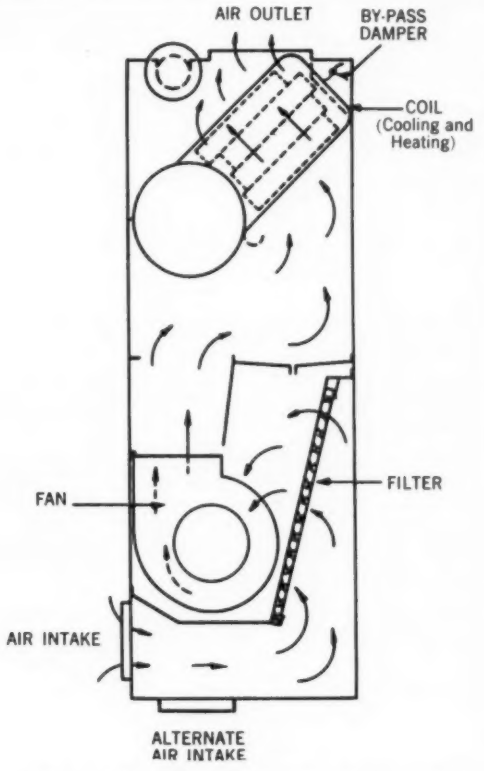
Servel's newest air conditioning project on the market is a direct gas fired unit that stands 74-in. high, 27-in. wide and 55½-in. long. This 3.3-ton unit is self-contained and is a single coil absorption-type unit. It performs the functions of cooling, dehumidifying, air cleaning and circulating in the summer — heating, air cleaning and circulating in the winter.

Ventilation with outside air may also be provided in the design of the duct system. Along with the nominal cooling capacity of three tons of refrigeration the unit has a heating input of 120,000 Btu per hour.

Gas is used as a source of energy for summer and winter operations. Gas burners supply heat to the absorption generator. The heated solution contained within the generator circulates throughout the system. Through an arrangement of traps and differences in pressure levels, and depending on whether condensing water is flowing, the single coil contained within the



New 3.3-ton Servel absorption unit occupies about half the space needed for former 3-ton unit. New unit is self-contained and is a single coil absorption-type. It performs functions of cooling, dehumidifying, air cleaning, and circulating in summer — and heating, air cleaning and circulating in winter. Unit has heating input of 120,000 Btu per hour.



unit functions to provide either heating or cooling.

Gas input at full refrigeration capacity is 75,000 Btu hourly and at delivered capacity 40,000 Btu hourly. At full heating capacity the gas input is 120,000 Btu hourly and the bonnet capacity is 96,000 Btu hourly.

The blower has a rated air quantity of 1200 cfm for the cooling cycle and a maximum air quantity of 1400 cfm for the cooling cycle with the by-pass open. Maximum air quantity for the heating cycle varies with desired leaving air temperature. A ⅓-hp motor is used for the blower.

The unit has two filters, 1-in. thick and 16 by 25-in. in size. The unit weighs 1060 lb.

The evaporative water cooler evaporates 8 to 10 gal of water an hour with a bleed-off of 10 gal an hour. Total make-up water required is listed at 18 to 20 gal per hour. Normal free air delivery is 1400 cfm and the minimum allowable air delivery is 1300 cfm. Size of the piping between the unit and conditioner is not to exceed 10 psi total pressure drop with a 23-ft head.

In size, the evaporative water cooler is 33-in. long, 41⅝-in. wide and 82½-in. high. Net weight is 795 lb.

Moving up the ladder, Servel's 5.4-ton unit is designed for larger homes of 10 rooms, or up to 2800 sq ft of floor area. Servel has two models of the 5.4-ton unit. Specifications are practically the same for both units.

For example, the fuel input, at full refrigeration and dehumidification capacity, is 112,000 Btu hourly for both models. At delivered capacity, the full input is 65,000 Btu hourly. Under standard conditions the cooling water required for the two models is 645 gal per hour and the dehumidification capacity is 31.2 per cent of the net cooling. Both models have a rated air quantity of 2000 cfm and a maximum air quantity of 2800 cfm.

For heating and humidification, the specifications change. Servel's model DE-96-G has a fuel input at full capacity of 120,000 Btu hourly while model DE-144-G requires 180,000 Btu hourly. At delivered capacity, full input, the hourly Btu requirement for model DE-96-G is 96,000 and for model DE-144-G, 144,000. Both models have a modulated two-step capacity control.

Minimum air quantity with inlet air at 75 degrees is 1300 cfm for the DE-96-G model and 1800 cfm for the other model. Maximum air quantity for both units depends on the minimum supply air temperature desired. The humidifier-evaporator for both units has a capacity of five pounds of water hourly.

For the blower, a ½, ¾ or 1-hp motor for model DE-96-G is called for in specifications. Model DE-144-G uses a ¾ or 1-hp motor.

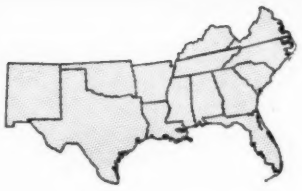
Both units use a 1600 sq in. filter, 2-in. thick. Weight of model DE-96-G is 2394 lb while its sister unit weighs 2556 lb. Service connections are the same with the exception of a 6-in. diameter flue pipe for model DE-96-G and a 7-in. diameter flue pipe for model DE-144-G.

Pressure drop of the condensing water circuit, at 10.7 gal per minute, is 2.9 psi for both units.

Both models use the same evaporative water cooler. Application data shows the water evaporated is 10 to 15 gal per hour with a bleed-off of 15 gal per hour. Total make-up water required is 25 to 30 gal per hour. Normal free air delivery on the evaporative water cooler is 2100 cfm and the minimum allowable air delivery is 2000 cfm. Size of the piping between the unit and conditioner is not to exceed 10 psi total pressure drop with a 23-ft head.

The evaporative cooler is 44¼-in. long, 41⅝-in. wide, and 82½-in. high. Net weight is listed at 1135 lb. ★ ★ ★

There's "gold" in those "summer peaks" . . .



Gas Air Conditioning In The Southern States

AGJ Survey Report

HOW important is the gas air conditioning market to companies operating in the Southern Gas Association area?

To find out, AMERICAN GAS JOURNAL has surveyed SGA member companies to determine the extent of gas air conditioning on their systems. Information on types of equipment, their application, and size of load in gas sold.

Results of the survey are both heartening and discouraging.

Encouragement can be found in the replies from a number of companies who are actively pursuing all phases of the gas air conditioning market — residential, commercial, and industrial — and getting results in sales and application.

Less encouraging were replies from a few companies who declared their efforts had been slight in pushing the sale of gas air conditioning. In fact, some companies (including several with 50,000 meters and over) declined to participate in the survey because they had little or no gas air conditioning load.

Survey Scope and Results

Participating in the survey were 20 distribution companies; representing a total 3,300,000 meters of all classes — residential, commercial and industrial. These companies range in size from 6000 to 700,000 meters. Ten of the companies have over 100,000 meters.

All told, these 20 companies reported 9673 gas air conditioning units in operation on their systems, ranging in size from 2-ton residential units up to 1000-ton industrial units.

The 9673 units represented a total of 155,271 tons of air conditioning and in 1955 consumed 6,184,017 Mcf of gas.

Of this 6,184,017 Mcf, residential customers used 25.5 per cent, commercial customers used 16.2 per cent, and industrial accounts consumed the remaining 58.3 per cent.

Of the total 155,271 tons, residential customers accounted for 17.2 per cent, commercial customers had 21.6 per cent installed, and industrial accounts had the remaining 61.2 per cent.

Residential Air Conditioning

Biggest market — in number of customers — is in the application of gas air conditioning to homes. While residential units (range: 2 to 10 tons in this survey) represent only 25 per cent of the total volume of gas consumed, they have a higher gas consumption rate per ton installed annually, and since most consumer services have a higher rate than commercial or industrial, are more profitable to the gas utility.

Average annual consumption of each of the 6033 residential units reported was 262,000 cu ft. On a per-ton-per-year basis, the rate was 60,000 cu ft.

Thus a 3-ton gas air conditioner would use approximately 180,000 cu ft each year — and most of this would be consumed in a 4-month period during the summer season.

Most of the residential units in service today — 5958 reported by the 20 companies — are gas-fired absorption type. Only 75 gas-engine driven units were reported, and 58 of these were installed in 1955.

The reason, of course is obvious, since there were few, if any, gas-engine driven units available in past years except on developmental basis or in custom-made units.

Residential Gas A/C Summary

	Absorption	Gas-Engine
Total Units on Line	5958	75
Total Tons on Line	26,248	535
Total Load (Mcf)	1,564,300	15,099
1955 Unit Sales	840	58
1955 Tons Sold	3134	420
1956 Sales Goal, Units	1500	800
5-year Sales Goal, Units	10,000	10,000

Projected sales figures, as reported by the companies, are encouraging. Most respondents noted that their estimates would probably prove "conservative" and noted that their firms intended to initiate strong sales campaigns and promotions. The 1956 goals for residential gas A/C installation sales are:

15 companies answering plan to sell nearly 1200 absorption-type units
11 companies answering plan to sell nearly 500 engine-driven units

For the five year period of 1956-1960, the sales goals are:

11 companies answering plan to sell nearly 6300 absorption-type units
8 companies answering plan to sell nearly 5800 engine-driven units

It should be noted that not all companies answered that part of the questionnaire relating to projected sales figures. On a comparative basis, the AGJ staff has "guess-timated" the potential residential A/C sales of these 20 companies for 1956 as follows: 1500 absorption-type units and 800 gas-engine-driven units.

For the five-year period, the projections are: **10,000 absorption-type units and 10,000 gas-engine-driven units.**

Commercial Air Conditioning

A very important market and the one with the greatest immediate potential for new business is the commercial gas air conditioning field. Equipment of this size (10 to 50 tons in the survey) is applicable to such business establishments as stores, small office buildings and manufacturing plants, medical clinics, etc.

It is interesting to note from the figures furnished by the 20 reporting companies that the number of units in commercial service — 3280 — is approximately half that of the number of residential units, but these 3280 units consume 2/3rds of the amount of gas (1,002,012 Mcf) used by the residential load of 1,579,399 Mcf.

Tons per unit average of the 3280 commercial gas A/C units is 8.64. Each unit consumes an average 305,000 cu ft annually, or 35,370 cu ft per ton per year. While the annual commercial ton-load rate is not as high as for residential units, the unit load rate is greater.

As with the residential market, most of the units used for commercial service are absorption-type, with 3103 reported, and 177 gas-engine driven units were listed by the 20 companies.

More absorption units were sold and installed in 1955 than gas-engine driven units — 286 to 51 — but the engine-drive units accounted for more air conditioning tons — 2845 to 2740.

Residential Gas Air Conditioning

Totals, All Types Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	51	171	1,280	21	80	32	200
2.	611	2,909	141,550	17	83	—	—
3.	14	52	1,224	7	29	15	45
4. (A)	—	—	—	—	—	—	—
5.	286	1,236	36,705	24	92	40	600
6.	30	153	4,110	—	—	—	—
7.	2112	9,337	417,024	239	1067	408	2,110
8.	138	681	24,486	21	105	30	—
9.	282	1,208	480,000	24	109	40	200
10.	574	1,992	69,322	224	710.5	355	1,775
11.	17	49	1,628	5	13	12	—
12.	115	515	27,600	12	42	—	—
13. (B)	1306	6,242	297,760	228	970	492	5,850
14.	39	199	3,800	5	24	16	125
15.	31	141	4,767	6	27	16	—
16.	37	120	2,856	16	35	26	300
17. (C)	51	160	—	23	75	34	250
18.	—	—	—	—	—	—	—
19.	32	155	8,000	1	5	1	—
20. (D)	307	1,450.5	57,097	25	105	80	600
Totals	6033	26,760.5	1,579,399	898	3554	1527	12,055

Gas Fired Absorption Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	% Sold By Company	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	50	168	1,230	20	77	100	30	150
2.	606	2,878	140,000	15	75	—	—	—
3.	14	52	1,224	7	29	100	15	45
4. (A)	—	—	—	—	—	—	—	—
5.	282	1,216	36,480	20	72	—	30	300
6.	28	145	4,060	—	—	74	—	—
7.	2,109	9,324	416,541	236	1,044	100	252	1,500
8.	137	676	24,336	20	100	—	20	—
9.	282	1,208	480,000	24	109	—	40	200
10.	549	1,839	66,403	209	619	84	305	1,525
11.	16	46	1,530	4	10	100	12	—
12.	115	515	27,600	12	42	—	30	—
13. (B)	1,284	6,011	289,496	206	739	93	267	1,825
14.	38	184	3,800	4	19	100	10	75
15.	31	141	4,767	6	27	—	15	—
16.	36	117	2,761	15	32	100	20	150
17. (C)	51	160	—	23	75	100	34	250
18.	—	—	—	—	—	—	—	—
19.	32	155	8,000	1	5	85	—	—
20. (D)	298	1,411	56,072	18	60	70	28	230
Totals	5,958	26,246	1,564,300	840	3,134	—	1,108	6,250

Gas Engine Driven Compressor Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	% Sold By Company	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	1	3	50	1	3	100	2	50
2.	5	31	1,550	2	8	—	—	—
3.	—	—	—	—	—	—	—	—
4. (A)	—	—	—	—	—	—	—	—
5.	4	20	225	4	20	—	10	300
6.	2	8	190	—	—	100	—	—
7.	3	13	483	3	13	100	56	610
8.	1	5	150	1	5	—	10	—
9.	—	—	—	—	—	—	—	—
10.	25	153	2,919	15	83.5	63	50	250
11.	1	3	98	1	3	100	—	—
12.	—	—	—	—	—	—	—	—
13. (B)	22	231	8,264	22	231	45	225	4,025
14.	1	5	—	1	5	100	6	50
15.	—	—	—	—	—	—	1	—
16.	1	3	95	1	3	100	6	150
17. (C)	—	—	—	—	—	—	—	—
18.	—	—	—	—	—	—	—	—
19.	—	—	—	—	—	—	1	—
20. (D)	9	59.5	1,075	7	45	30	52	370
Totals	75	534.5	15,099	58	419.5	—	419	5,805

(A) Included in Commercial.
(B) One Distribution Division Included.
(C) Industrial Load, Units Included.
(D) One Division Combined with Commercial.

In answer to the inevitable question, "how much do you plan to sell in 1956 and over the five-year period of 1956-60?" the following answers were received on commercial installation sales goals:

16 companies plan to sell nearly 600 absorption-type units in 1956

11 companies plan to sell nearly 3300 absorption-type units in 1956-60

11 companies plan to sell nearly 175 gas-engine units in 1956

9 companies plan to sell nearly 2000 gas-engine units in 1956-60

Projecting these figures to cover all 20 companies (taking into account present installations, 1955 sales, and company size), AGJ staff has come up with the following "guess-timate" on potential commercial gas A/C sales as follows:

For 1956, sales of 800 absorption-type and 325 gas-engine units

For the five-year period of 1956-60, sales of 4500 absorption-type and 4000 gas-engine units.

Commercial Gas A/C Summary

	Absorption	Gas-Engine
Total Units on Line	**3103**	**177**
Total Tons on Line	**20,982**	**7341**
Total Load (Mcf) Annually	**777,293**	**225,719**
1955 Unit Sales	**286**	**51**
1955 Tons Sold	**2740**	**2845**
1956 Sales Goal, Units	**800**	**325**
5-Year Sales Goal, Units	**4500**	**400**

Industrial Air Conditioning

When it comes to gulping up gas and producing profits, you can't beat the industrial air conditioning load. Not all of the 20 responding companies had industrial installations (50 tons and over) but with those that do, the figures are impressive.

For instance, the 360 units reported range in size up to 2400 tons, and average out at 278 tons per installation. Average gas use per year for these units is 10,000,000 cu ft. Average annual gas consumption is approximately 36,000 cu ft per ton.

During the average 5-month cooling season, these 360 units producing 100,167 tons of air conditioning use some 3,600,000 Mcf of gas — a nice summertime load in anyone's books.

One company pointed out in its reply that the industrial air conditioning load was its biggest moneymaker — and also helped make the firm's operations more efficient.

Most of the units reported are of the steam absorption type. These 223 units have a capacity of 14,935 tons and consume 509,351 Mcf annually in cooling load.

Steam driven compressor units are the "big boys" of the air conditioning field. Nine companies reported 99 units on their lines, totaling 82,699 tons — an average of 835 tons per unit. They use a lot of gas to provide cooling — nearly 2,500,000 Mcf per year.

Gas engine-driven compressor units were in the minority —with 38 reported and totaling 2533 tons for an average of 66.6 tons each. Their consumption, however, was much higher per unit than either steam absorption or steam driven compressor units.

Nearly one-fourth of the total industrial tonnage load reported was added in 1955 — 23,715 tons of a total 100,-167 tons. Most of this was in steam-driven compressor units.

Asked to estimate the tonnage on gas A/C units that would be installed in both new buildings and in existing plants and buildings, the companies active in industrial gas air conditioning replied as follows:

36,600 tons to be added in steam absorption plants in 1956-60

54,600 tons to be added in steam-driven compressor units in 1956-60

9100 tons to be added in gas-engine driven compressor units in 1956-60

Conclusions

Those companies actively selling gas air conditioning to prospective customers are getting results. The major advantage of a gas-operated air conditioning unit is economy of operation, and by pushing this strongly, these companies are building big summer loads.

Secondly, with air conditioning becoming more popular —and less expensive, generally — plus the fact that it is a "must" in most commercial and industrial establishments, the potential is virtually unlimited for sales of gas-operated air conditioning units.

Availability of gas-engine driven compressor units for residential application this year and in the future in greater quantities will bolster this market. More competition is needed, and these units should supply it.

Aggressive promotion and selling by the utilities themselves, not only on residential units, but also in commercial and industrial equipment is needed.

As one reply put it, "if (the industry) doesn't get busy selling gas for cooling purposes as well as heating, we'll wake up some day and find the electric utilities taking away our heating loads, too."

That's the story. The gas air-conditioning picture looks good. It can look a lot better in the future if the industry works hard at supplying its potential market.

Commercial Gas Air Conditioning

Totals, All Types Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	41	187	2,176	5	38	12	65
2.	422	2,265	151,500	4	83	—	—
3.	25	197	3,188	13	112	15	75
4. (A)	210	1,050	55,000	6	18	125	1500
5.	236	1,595	44,805	18	201	27	400
6.	25	188	5,264	—	—	—	—
7.	901	7,169	256,618	71	650.5	130	795
8.	99	2,788	120,930	33	624	30	—
9.	177	953	19,000	5	21	20	100
10.	250	5,488.5	129,663	57	2048.5	112	560
11.	85	784	20,916	8	45	24	—
12.	117	1,046	59,160	—	—	25	—
13. (B)	358	2,134	69,675	76	602	145	1370
14.	5	175	500	3	75	3	35
15.	23	389	11,112	2	28	5	—
16.	29	348	4,269	9	122	13	125
17. (C)	92	466	—	16	84	35	—
18.	1	5	50	—	—	—	—
19.	33	160	8,300	2	10	—	—
20. (D) (E)	151	905	39,886	9	823	22	178
Totals	3280	28,292.5	1,002,012	337	5585	743	5203

Gas Fired Absorption Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	% Sold By Company	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	41	187	2,176	5	38	100	10	50
2.	417	2,170	104,000	2	50	—	—	—
3.	25	197	3,188	13	112	77	15	75
4. (A)	210	1,050	55,000	6	18	—	100	1,000
5.	231	1,392	41,760	14	48	—	20	200
6.	25	188	5,264	—	—	90	—	—
7.	822	4,836	197,288	66	541	99	102	605
8.	93	2,694	120,930	28	600	—	25	—
9.	177	953	19,000	5	21	—	20	100
10.	220	2,226	57,595	38	326	55	76	380
11.	85	784	20,916	8	45	100	24	—
12.	97	546	27,160	—	—	—	20	—
13. (B)	334	1,599	60,731	65	524	75	100	700
14.	3	75	—	3	75	100	3	20
15.	23	398	11,112	2	28	—	5	—
16.	26	243	3,417	7	52	100	10	75
17. (C)	91	416	—	15	34	100	30	—
18.	1	5	50	—	—	—	—	—
19.	33	160	8,300	2	10	85	—	—
20. (D)(E)	149	872	39,406	7	218	40	9	55
Totals	3,103	20,982	777,293	286	2,740	—	569	3,260

Gas Driven Compressor Units

Company	Units on Line	Tons on Line	1955 Cooling Load (MCF)	1955 Unit Sales	1955 Tons Sold	% Sold By Company	1956 Sales Goal (Units)	5-Year Sales Goal (Units)
1.	—	—	—	—	—	100	2	15
2.	5	95	47,500	2	33	—	—	—
3.	—	—	—	—	—	—	—	—
4. (A)	—	—	—	—	—	—	25	500
5.	5	203	3,045	4	153	—	7	200
6.	—	—	—	—	—	90	—	—
7.	79	2,363	60,330	5	109.5	91	28	190
8.	6	94	—	5	24	—	5	—
9.	—	—	—	—	—	—	—	—
10.	30	3,262.5	72,068	19	1,722.5	44	36	180
11.	—	—	—	—	—	—	—	—
12.	20	500	32,000	—	—	—	5	—
13. (B)	24	535	8,944	11	78	50	45	670
14.	2	100	500	—	—	100	—	15
15.	—	—	—	—	—	—	—	—
16.	3	105	852	2	70	100	3	50
17. (C)	1	50	—	1	50	100	5	—
18.	—	—	—	—	—	—	—	—
19.	—	—	—	—	—	—	—	—
20. (D)(E)	2	33	480	2	605	20	13	123
Totals	177	7,340.5	225,719	51	2,845	—	174	1,943

(A) Includes Residential and Industrial.
(B) One Ditsr. Div. Ind.
(C) Includes Industrial.
(D) One Distr. Div. Includes Res. and Ind.
(E) One Distr. Div. Combined with Residential.

TABLE 3. Industrial Gas Air Conditioning

Totals, All Types Units

Company	All Installations: Units on Line	All Installations: Tons on Line	Stores, Offices, Hospitals, etc.: Units on Line	Stores, Offices, Hospitals, etc.: Tons on Line	Manufacturing Plants: Units on Line	Manufacturing Plants: Tons on Line	Per Cent Competitive Position: Gas Operated	Per Cent Competitive Position: Electrically Operated	1955 Record: Tons Added to Line	1955 Record: Total Cooling Load (MCF)	1955 Record: Per Cent Being 3rd Party	5-Year Estimate: New Construction (Tons)	5-Year Estimate: Existing Buildings or Plants
1.	3	200	1	150	2	50	75	25	150	5,400	100	200	100
2.	8	3,550	6	2,250	2	1,300	5	95	2,100	—	100	—	—
5.	59	27,029	43	7,029	16	20,000	—	—	350	890,000	100	4,250	2,250
6.	19	5,503	13	4,088	6	1,415	5	95	2,375	86,000	100	20,500	10,500
7.	78	38,624	44	16,979	24	21,645	39.4	60.6	15,274	1,527,040	99.2	29,650	1,600
8.	3	1,605	1	105	2	1,500	—	—	—	—	—	—	—
9.	26	14,367	18	4,367	8	9,900	—	—	450	—	—	—	—
13.	78	7,781	67	4,455	11	2,326	4.2	95.8	1,435	486,800	8.75	14,150	7,100
15.	1	395	1	395	—	—	—	—	—	10,665	100	—	—
16.	—	—	—	—	—	—	5	95	1,335	70,800	100	2,750	1,050
19.	2	50	2	50	—	—	—	—	—	1,980	—	50	50
20.	83	1,163	65	977	8	211	12.5	37.5	1,021	8,271	30	4,800	2,400
Totals	360	100,167	261						23,715	3,612,606		76,350	25,050

Steam Absorption Units

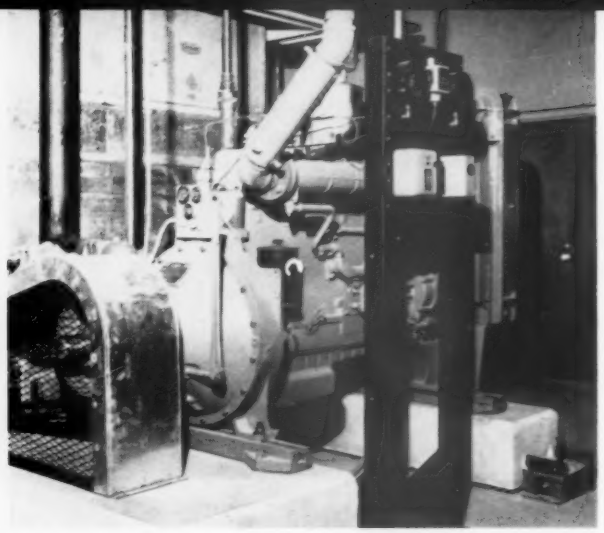
Company	All Installations: Units on Line	All Installations: Tons on Line	Stores, Offices, Hospitals, etc.: Units on Line	Stores, Offices, Hospitals, etc.: Tons on Line	Stores, Offices, Hospitals, etc.: Tonnage Range	Manufacturing Plants: Units on Line	Manufacturing Plants: Tons on Line	Manufacturing Plants: Tonnage Range	1955 Record: Tons Added to Line	1955 Record: Total Cooling Load (MCF)	5-Year Estimate: New Construction (Tons)	5-Year Estimate: Existing Buildings or Plants
1.	3	200	1	150	150–150	2	150	25–25	50	1,800	100	50
2.	4	550	4	550	100–150	—	—	—	—	—	—	—
5.	38	4,244	38	4244	—	—	—	—	—	235,000	2,000	1000
6.	14	2,953	8	1583	115–322	6	1415	25–425	725	35,000	10,000	5000
7.	15	1,975	12	1515	75–350	3	460	—	890	95,300	8,250	1000
8.	1	105	1	105	—	—	—	—	—	—	—	—
9.	8	1,677	8	1677	130–250	—	—	—	—	—	—	—
13.	62	2,321	58	2265	5–215	4	56	3–350	300	118,000	3,450	1500
16.	—	—	—	—	—	—	—	—	225	17,500	600	400
19.	2	50	2	50	—	—	—	—	—	1,980	50	50
20.	76	860	58	674	2–200	8	211	3–15	209	4,771	2,225	925
Totals	223	14,935							2399	509,351	26,675	9925

Steam Driven Compressor Units

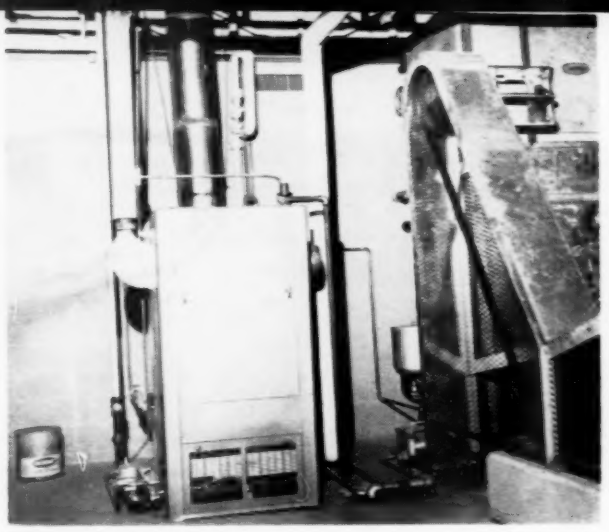
Company	All Installations: Units on Line	All Installations: Tons on Line	Stores, Offices, Hospitals, etc.: Units on Line	Stores, Offices, Hospitals, etc.: Tons on Line	Stores, Offices, Hospitals, etc.: Tonnage Range	Manufacturing Plants: Units on Line	Manufacturing Plants: Tons on Line	Manufacturing Plants: Tonnage Range	1955 Record: Tons Added to Line	1955 Record: Total Cooling Load (MCF)	5-Year Estimate: New Construction (Tons)	5-Year Estimate: Existing Buildings or Plants
1.	—	—	—	—	—	—	—	—	—	—	—	—
2.	4	3,000	2	1,700	800–900	2	1,300	600–700	2,100	—	—	—
5.	21	22,785	5	2,785	—	16	20,000	—	350	655,000	2,000	1000
6.	5	2,550	5	2,550	300–600	—	—	—	1,650	51,000	10,000	5000
7.	42	34,909	52	14,784	250–1000	17	20,125	400–2400	14,324	1,370,600	21,000	500
8.	2	1,500	—	—	—	·	1,500	250–1250	—	—	—	—
9.	17	12,550	9	2,650	200–950	8	9,900	1100–2200	450	—	—	—
13.	5	5,000	3	3,000	—	2	2,000	—	1,000	375,000	10,000	2000
15.	1	395	1	395	-395	—	—	—	—	10,665	—	—
16.	—	—	—	—	—	—	—	—	225	17,500	600	400
20.	2	10	2	10	5–5	—	—	—	600	—	1,500	600
Totals	99	82,699							20,699	2,479,765	45,100	9500

Engine Driven Compressor Units

Company	All Installations: Units on Line	All Installations: Tons on Line	Stores Offices, Hospitals, etc.: Units on Line	Stores Offices, Hospitals, etc.: Tons on Line	Stores Offices, Hospitals, etc.: Tonnage Range	Manufacturing Plants: Units on Line	Manufacturing Plants: Tons on Line	Manufacturing Plants: Tonnage Range	1955 Record: Tons Added to Line	1955 Record: Total Cooling Load (MCF)	5-Year Estimate: New Construction (Tons)	5-Year Estimate: Existing Buildings or Plants
1.	—	—	—	—	—	—	—	—	100	3,600	100	50
5.	—	—	—	—	—	—	—	—	—	—	250	250
6.	—	—	—	—	—	—	—	—	—	—	500	500
7.	21	1740	17	880	25–330	4	1060	—	60	601,340	400	100
9.	1	40	1	40	—	—	—	—	—	—	—	—
13.	11	460	6	190	5–35	5	270	150–270	135	1,750	1700	3600
16.	—	—	—	—	—	—	—	—	110	3,300	150	150
20.	5	293	5	293	16–76	—	—	—	212	3,500	675	675
Totals	38	2533							617	613,490	3775	5325



Heart of system is this 110-hp gas engine, that powers the refrigerant compressor. Note control panel rack at right, jacketed exhaust manifold, shock-absorbing mounting for engine and compressor.



Hot water for winter heating is provided by this 700,000 Btu boiler. At left is power take-off from compressor shaft pulley, which operates water circulating pump on evaporative cooler unit.

New Plant Features Low Cost Gas Air Conditioning System

Dean Hale, Editor

AT Universal Controls Corporation's new plant and office building in Carrollton, Texas, 15 miles from downtown Dallas, gas is being utilized to the Nth degree—heating, air conditioning, and even lighting—and saving money in operating costs in so doing.

Gas is the chief reason for Universal's existence, and the company and its personnel believe in promoting the use of gas.

Catching the eye of the visitor arriving at the plant are two antique lights at the front entrance to the building. The lights are identical to those used at Disneyland in California.

Chief feature, though, of the new 22,000 sq ft building that Universal has occupied since the first of the year is the 'year-around all-gas air conditioning system. Incorporated into the system are a 65-ton cooling unit for the warm summer season and a hot-water heating system for the winter months.

Aside from the fact that a company in the business of manufacturing products for the gas industry should use gas whenever possible, Universal's decision to install a gas-engine driven air conditioning system was based primarily on economics.

Or, to put it simply, they are air conditioning the entire 22,000 sq ft plant at approximately ⅓ or less what electric power would cost.

Heart of the system, which was engineered and designed by Carrier Bock Company of Dallas, local distributor for Carrier, is a 110-hp heavy duty Waukesha oil field type gas engine.

Fuel gas for the engine is supplied from a volume tank 14-in. in diameter and 9 ft in length, which is supported from the ceiling above the engine. Gas is received at the tank at 20 psi and is reduced through a Universal regulator to a constant 6-oz delivery pressure.

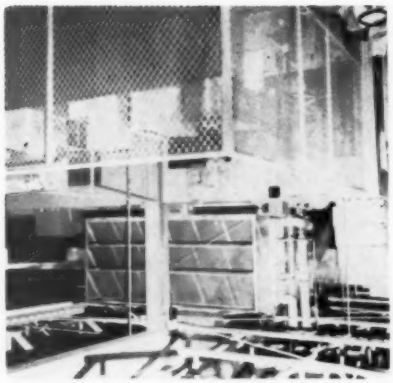
As recommended by the manufacturer, the engine is run at a speed of 1000 rpm. Through a five V-belt drive, the compressor is driven at a speed of 1500 rpm by using 3:2 speed ratio pulleys.

The compressor pulley has seven grooves, with the two outside grooves used to transmit power through two additional V-belts to run the air fans on the evaporative condenser. The condenser is located adjacent to the engine and makes this "take-off" practical. Otherwise, a 7½-hp electric motor would have been necessary to drive the fans.

The engine and compressor are mounted on a reinforced concrete block that is suspended off the floor

Entrance to Universal's new 22,000 sq ft home is dramatically highlighted by two antique gas lights that burn day and night.

Universal vice president Chas. D. Peterson checks flow of gas through meter. Gas engine driven unit uses only 460 to 560 cu ft of 1000 Btu gas per hour, at cost of 20 cents per hour.



Chilling unit in plant is centrally located. Dampers on air outlet from expansion coils are controlled by thermostats. Unit has both refrigerant expansion coils and heating coils.

Interior of plant. At left, near ceiling in background, is cooling unit for offices. At right is plant unit. Ductwork and lines for refrigerant and hot water can be seen in photograph.

about 1-in, and supported by Korfund shock absorbers—a combination of coil springs mounted in rubber.

A small amount of vibration can be felt in the concrete block, but none is transmitted to the engine room floor.

Air is drawn into the engine room at the rate of 14,000 cfm through louvers in the east wall of the engine room. This air first passes over the engine, helping to keep it cool, and then goes into the evaporative condenser where the refrigerant is cooled. Moist air from the condenser is discharged out through duct work to the space above the engine room.

Engine exhaust is also ducted through the ceiling to the roof where a Burgess-Manning snubber deadens the sound and makes the engine operation inaudible outside.

The gas engine is provided with a normal type of radiator and a conventional type engine fan for drawing air through the radiator. The exhaust manifold is jacketed to reduce heat that would otherwise be dissipated into the room. To date, with outside temperatures running to 90 F, the engine temperature has not exceeded 160 to 180 F.

Possible damage to the engine or compressor is prevented through the application of various safety devices. Mercoid type pressure controls protect the compressor against high or low suction and high or low discharge pressures.

Control range of the compressor is accomplished through a pressure control that "steps out" the compressor cylinders one at a time (as the temperature in the cooled area drops to the desired point) down to a point where only one cylinder in the compressor is operating. This gives a compressor operating range of 15 to 100 per cent of load.

This control system operates in this manner: as less heat is taken out of the air at the expansion coils, the suction pressure to the compressor (outlet side of the expansion coils) is higher. The higher the suction pressure at the compressor, the fewer cylinders in operation.

Other safety features include shutdown of both engine and compressor in case of failure of lube oil pressure on engine, failure of lube oil pressure on compressor, or high jacket water temperature on engine.

Thermostatic controls in the plant area and in the office area control the amount of air reaching these locations. As the area involved cools, damper motors close the dampers at the expansion coils, reducing the air flow. This, in turn, causes the compressor unit to cut back as refrigerant pressure rises.

Freon 22 is used for the refrigerant. From the evaporative condenser, the refrigerant is conveyed out to the two separate expansion coils. These chilling units are equipped with filters and motor driven fans. A separate suction line returns the refrigerant back to the suction side of the compressor .

Duct work is provided to both the office and manufacturing plant areas and each area is independently controlled.

For wintertime heating, each of the two air units is also equipped with a separate hot water coil. Hot water is provided by a 700,000 Btu boiler located in the engine room. A 1-hp motor driven pump keeps the water circulating constantly. Operation of the dampers is controlled by the same thermostats. Temperature of the return water from the hot water coils is the control factor on the operation of the boiler unit.

The gas engine driven air conditioning system has proven very practical.

Using 1000 Btu gas, fuel requirements range from 460 cu ft minimum to 560 cu ft maximum per hour. At the industrial rate of 40 cents per Mcf, this means the actual fuel cost per hour is approximately 20 cents. Based on a 720 hour month, the bill should not be over $144—and that is assuming the unit would run full load day and night for a full 30 days, which is not likely.

Some electric power is used. A total of 12½-hp is needed for water circulation on the evaporative cooler and for the two motors to drive the fans on the chilling units.

Initial cost for the overall installation was slightly higher than if an electric motor had been installed as the prime mover. The gas engine cost approximately twice what an electric motor for the same purpose would have cost.

But, according to Universal's vice president Chas. D. Peterson, the additional cost can be made up in savings on operating costs in one season's operation. And the long term savings over a long period of 10 to 15 years will more than pay for the system.

Universal Controls Corporation began operation in 1947 manufacturing gas service regulators. Since that time, some 600,000 have been delivered to more than 300 gas companies in 40 states, Canada, and Mexico.

The firm has grown rapidly and added numerous products to its manufacturing line, including meter nuts and unions, breather vents, meter repair racks, regulator repair and test stands, and leak detectors.

Officers and directors of the company include Donald O'Neal, president; Chas. D. Peterson, vice president; Chas. C. Pierce, vice president; Harland Mayes, secretary; J. H. Rauscher, Sr., secretary; and J. H. Rauscher, Jr., assistant secretary and treasurer. ★ ★

Dominating the Dallas skyline is the 40-story Republic Bank Building, whose all-gas air conditioning system uses 200,000,000 cu ft annually. It is one of 24 buildings classified as industrial accounts that consume 924,000 MCF each year.

Gear up to sell industrial gas air conditioning; big users mean more revenue, better operation

How to Build Bigger Summer Loads

Bruce Cunningham *Lone Star Gas Company, Dallas*

HOW to sell as much gas in summer as in winter? A perpetual question that plagues all gas companies, it has been taken as a challenge by Lone Star Gas Company, which decided to not only find the answer but also do something about it.

In the summer of 1955, the company sold approximately 924,400,000 cu ft of gas to provide cooling and refrigeration in 24 separate Dallas buildings classed as industrial air conditioning accounts.

That volume of gas, which is over and above the loads required to produced cooling for thousands of residential and commercial air conditioning units in Dallas, produces an "extra" revenue amounting to approximately $185,000.

It is also a tribute to a long-time aggressive and successful sales and promotion program conducted by the Industrial Department of Lone Star's Dallas Division of Distribution.

The program had its beginning in 1939. Forming the basic program are exhaustive and deep-rooted statistics and pertinent facts, results of surveys, and cost comparisons between gas and electricity, a wealth of information that is made available to potential customers and which is considered highly important in the overall selling program.

In the hot summer clime of Dallas, owners of large occupancy buildings have found the cool and invigorating "man-made" temperatures almost mandatory in keeping occupancy at a profitable point. Dependable, low cost gas service is helping to maintain this occupancy and make profits.

By the addition of summer cooling combined with winter heating loads, Lone Star has also increased its Dallas industrial sales load factor from 75 per cent to approximately 92 per cent. This covers a period of seven years through 1955.

A substantial increase is expected in the industrial sales load factor in 1956 due to anticipated new gas cooling installations. Lone Star has prospects that could lead to a possible industrial sales load factor of 100 per cent by the end of 1957.

Lone Star conducts similarly successful air conditioning sales and promotion programs throughout its operating territory, which consists of 451 communities, towns and cities in Texas and Oklahoma. Separate operations are conducted by the Fort Worth Division of Distribution of about 50 towns, the General Division of Distribution, which operates in almost 400 towns, including several metropolitan areas, and the Dallas Division of Distribution covering the Greater Dallas Area with approximately 190,000 residential, commercial and industrial customers.

Lone Star's Dallas Division of Distribution was chosen as the subject of this article, primarily because the 1956 Southern Gas Association convention is being held in Dallas where delegates may arrange to tour the numerous industrial gas cooling installations.

These installations consist of 46 separate gas units in the 24 buildings. The total cooling capacity is 16,635 tons, which is the equivalent to melting 33,270,000 lb of ice every 24 hours.

Structures with gas cooling and refrigeration facilities include stores, office buildings, hospitals, theaters, banks, churches, a 1001-room hotel, a major university, and the world's largest refrigerated warehouse. Capacities range from 70 tons at the Kessler Park Methodist Church to 2200 tons at the Baylor University Hospital.

The 46 units consist of 10 steam absorption units with 1410 tons of cooling capacity, 22 steam driven compressors with 13,760 tons capacity, and 14 gas engine driven compressors totaling 1465 tons of cooling capacity.

Sales Program Pays Off

Since the sales and promotion program started 17 years ago, the trend to air conditioning on an industrial scale in Dallas has grown steadily through well-organized and well-planned efforts. Today the trend is behaving like a guided missile that only wants to go up.

Here's factual proof: At year's end in 1939, the total gas load for summer cooling in Dallas buildings amounted to 575 tons. At the close of 1955, the load had reached the 16,635-ton stage and the sales "missile" was still rising.

Existing contracts for 1956 call for 2050 tons and 2900 new tons are planned for 1957. This means total cooling capacity by the end of 1957 will have reached 21,585 tons.

The Federal Reserve Bank was the first large Dallas office building to be air-conditioned by gas-operated equipment. This was early in 1939 and the load amounted to 500 tons produced by steam turbine driven compressors. Later in the year, the Great National Life Building was air-conditioned with gas engine driven compressors of 75 tons of capacity.

By the end of 1949, the load had been increased to 3755 tons. One of the big installations that year was the gas air conditioning for cold storage

used in food preservation at the Alford Refrigerated Warehouse, the "world's largest refrigerated warehouse." Alford, with 7,500,000 cu ft of space, requires 1000 tons of refrigeration, which is produced by gas engines.

Big Bank Goes Gas

During 1954, a total of 3700 tons of industrial gas air conditioning was added in Dallas, including facilities for Texas' tallest building — the 40-story Republic Bank Building. Some 2000 tons of air conditioning capacity are required for the summer cooling of bank patrons and employees and others who work or transact business in the hundreds of separate offices occupied by building tenants. Total air-conditioned area contains approximately 900,000 sq ft of floor space, including the mammoth lobby covering nearly an acre. It is one of the largest unobstructed bank lobbies ever built.

Lone Star estimates that the bank buildings summer and winter air conditioning operation will consume in excess of 200,000,000 cu ft of gas annually. An additional 5,000,000 cu ft of gas is required for general building hot water requirements and for cooking in the bank's employee cafeteria.

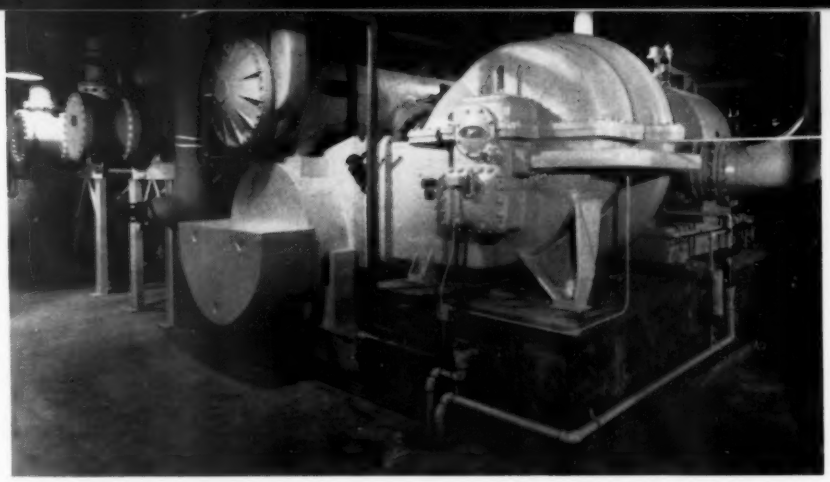
The building, with 36 stories above ground and four below, is cooled by two 1000-ton steam turbine driven centrifugal refrigeration machines. Two gas-fired water tube boilers produce steam to drive the turbines operating the refrigeration machines. In winter, the boilers provide hot water for heating the building.

Other large installations in 1954 included Parkland Memorial Hospital with 1200 tons; Southwestern Medical School, 500 tons; Baylor University Hospital, an additional 1000 tons; the Medical Arts Building, converted from electricity, with 1000 tons; and Southern Methodist University, 1000 tons.

New Statler Is Big Load

Four thousand tons of industrial gas air conditioning capacity were installed in Dallas buildings in 1955. This figure included 1400 tons of capacity providing "man-made" climate throughout the new Statler Hilton Hotel. Individual control units in each of the 1001 guest rooms permit selection of temperature desired. Temperature and moisture content is also thermostatically controlled in dining rooms, restaurants, meeting rooms, shops, stores and employee locker rooms to produce comfort conditions required at any given time by the occupants.

Halls and corridors in the hotel proper receive the excess conditioned air which has not entered the guest rooms. The fresh outside air comes directly to a room and then goes directly outdoors through an exhaust air outlet on the wall. The volume of intake being slightly more than the volume of air exhausted, the excessive amount of air finds its way to the corridors through the undercut guestroom doors.



Year around air conditioning system of new Statler Hilton Hotel takes biggest share of estimated 212,000,000 cu ft used annually by new hotel. Above, one of two 753-hp gas-generated steam turbine-driven centrifugal refrigeration units.

Lone Star estimates that the summer and winter air conditioning load combined with loads for hot water, laundry, cooking and numerous other needs will approximate 212,000,000 cu ft annually.

The 20-story hotel is cooled by two 753-hp steam turbine driven centrifugal refrigeration machines. Three 380-hp gas-fired water tube boilers produce steam to drive the turbines operating the refrigeration machines. In winter, the boilers provide hot water for the laundry and heating the building. Each of the three gas boilers has capacity to generate 25,000 lb of steam per hour under 250 lb of pressure per square inch.

Other installations in 1955 included an additional 1000 tons at Southern Methodist University; 700 tons at the main office building of the Southwestern Bell Telephone Company, and 500 tons for the second unit of the Southwestern Medical School.

How Gas A/C Increases Load

To what extend does gas air conditioning for large applications such as these increase the load on a gas company's lines? An example given by Lone Star is the 1000-ton steam turbine-driven centrifugal compressor system installed at Baylor University Hospital in 1954, which brought the total cooling capacity to 2200 tons.

The load for heating and hot water usage varied from about 18,500,000 cu ft of gas in January to 6,800,000 in June, with an annual load factor of about 61 per cent. The additional load imposed by the air conditioning system uses gas to the extent that the high and low months are now 18,500,000 cu ft and 14,300,000 cu ft respectively, or a load factor of 104 per cent, an increase of 43 percentage points. This is based on the performance of the season of 1955-56.

What has given rise to this growing trend in the use of gas for air conditioning large buildings in Dallas? Basically, it is due to the low-cost of energy produced by the use of natural gas and its facilities. This advantage and the dependablility of gas are major factors in decisions made by economy and practical-minded builders to air condition new office buidings, hotels, hospitals and numerous other large-occupancy stuctures in Dallas.

Aggressive Selling Is Key

But interwoven with all these advantages are the aggressive efforts of the Dallas Division's Industrial Department in "telling and selling" the gas story to the potential customers. The sales and promotion program around air conditioning large buildings reflects the over-all responsibility of the Industrial Department, that of "selling industrial gas through various means."

Since 1947, when he was appointed manager of the Industrial Department, the program has been under the direction of John F. Moore, engineering graduate of Southern Methodist University, who began his career with Lone Star in 1933 as a serviceman in the shop department. Prior to his appointment he had worked in the Industrial Department as an engineer since 1939, the year in which the sales and promotion program was started under the direction of the late L. G. Waskom.

Last February 1 Moore was appointed chief engineer of the Dallas Division, and his successor as manager of the Industrial Department is A. B. McCurdy, former Dallas Division distribution engineer. Moore will continue for a time to supervise the program under the over-all direction of L. A. Bickel, vice president in charge of the Dallas Division.

Facts and Contacts . . . The Key to Selling Industrial Gas Air Conditioning

You Need Facts . . .

Statistics, facts, information, surveys and cost comparisons between gas and electricity requiring months and often years to accumulate are applied before a building is eventually on the dotted line for gas air conditioning facilities. The sale and promotion of gas for air conditioning at the Statler Hilton Hotel in Dallas required approximately two years. To help "prepare his case," Moore spent three days at the Shamrock Hotel in Houston surveying and gathering information and facts to point up the economic advantages of gas air conditioning for Dallas' newest hotel.

. . . and Contacts

The program calls for ceaseless contacts with architects, builders, engineers and other technical persons whose decisions are followed in the selection of the kind of energy to be used for air conditioning operations.

One of the most important elements of the "sales" phase of the program is the matter of cost difference between gas and electricity. In most instances, the savings possible through the use of gas has been the deciding factor.

A case in point is the report developed for the City of Dallas in the selection of the prime movers for the gas air conditioning system being installed in the new Love Field Airport Terminal.

The report, which required 2 weeks to compile, showed that, by using gas steam turbine-driven compressors rather than electric motor-driven compressors, the city "would pay out their additional investment, if any, in less than one year," and further, the "city will save in operating cost alone in excess of $12,250 annually and approximately $236,000 during the first 20 years . . ." The report was in addition to more than a year of preliminary discussions and conferences with architects, mechanical engineers, city representatives and others.

"Each job," says Moore, "is a separate and distinctly different problem of selling gas for air conditioning. In that respect, all reports, information, statistics, cost comparisons must be tailor-made to fit the requirements of each potential customer. There is no standard information questionnaire that will meet the over-all need. We find it advantageous to prepare a special fact sheet for each job."

"Sales develop where you find them," he continues, "and nothing should be overlooked in order to make the initial contact. We use the telephone, correspondence, personal calls and telegrams."

He recited the case of the telephone inquiry which started the ball rolling for a 500-ton gas air conditioning installation in a Dallas store building.

"We read in the paper," he relates, "that a new firm was moving to Dallas. We called the manager by phone and asked him to consider gas for air conditioning. He expressed interest, thanked us and concluded the conversation. Some weeks later we received a telephone call from the manager. He wanted us to present a report. The sale was eventually made."

Last year at the SGA convention in New Orleans, Moore appeared on the Industrial Sales Forum to discuss "Installation and Application of Gas Engines and Steam Turbines for Air Conditioning." He went beyond the subject to include "points to remember in making competition for the electric utilities.

"This subject is timely and your competition is keen," he said. "This large air conditioning load can certainly influence your company's residential load because it makes homemakers conscious of the comfort derived from air conditioning.

"Know your electric rates and how they are applied," he continued, "study the jobs you have lost and locate your weak points. If possible, obtain the reason from the architect, mechanical engineer or builder why electricity was chosen rather than gas.

"Know your architects, mechanical engineers and potential customers. Visit the first two, often, in their offices or at luncheons, and assist them even on a job where you might obtain only the heat and hot water load. Know your customer, his way of thinking, his accounting and his experience in connection with the subject."

In his promotional work he finds it valuable to "be a personal friend of architects and engineers." He urged obtaining their permission to contact the customer "and one of the MUSTS is to have your assumption or data approved by them."

Other points brought out:

Do your selling before plans are completed and out for bids. Changing them costs time and money and leaves you still vulnerable to the competition.

Make your reports "truthful, brief and attractive." Vary a report according to the person who is to have the final say in selecting the type of energy to operate the air conditioning system.

Help customers to secure their equipment, where possible and practical.

Conduct joint promotional meetings with distributors, your own gas company, architects and engineers.

Advertise industrial gas air conditioning installations in newspapers and other publications read by the general public.

Lone Star supports the sales and promotion program with advertising of various media. Special emphasis is placed on the larger buildings through full-page ads and news stories in special sections promoted by the Dallas papers.

Special sections in The Dallas News and The Dallas Times Herald celebrated the opening of the new Statler Hilton Hotel in Dallas last January. Caption for Lone Star's two-page ad read: *"GAS does all these jobs in the new Statler Hilton Hotel! from COOKING to AIR CONDITIONING."* The advertisement was illustrated with photographs showing gas air conditioning, cooking and numerous other items of equipment operated by gas or gas-generated steam.

A news story approximately two columns in length told about the uses of gas at the hotel. Written by advertising department personnel, the article was captioned: "Natural Gas Plays Big Role in Statler Hilton Service."

Moore contends that more gas companies should avail themselves of the opportunities of the big loads and revenues afforded them through the sale of gas for summer cooling.

"The field is wide open," he says, "and our industry has a great potential market for sales in summer through industrial gas air conditioning installations. The extra load derived by a gas company is just as big as the efforts of a sales and promotion program behind it."

Lone Star has literally accepted its own sales story. All four buildings of the Dallas general headquarters are air conditioned. The two main buildings, 10 and 11 stories, are cooled by four Carrier absorption machines of 160-tons each. A third building is cooled by three Servel DUT water chillers of 75-ton capacity, and the fourth building is cooled by a 60-ton Ready-Power unit. The new Logan Street Service Center now under construction will utilize 200 tons of air conditioning produced by a Carrier absorption unit. * * *

It will be mighty convenient for interested SGA convention delegates to slip out the back door of the Statler Hilton Hotel, dash across Jackson Street and make a tour of the Lone Star installations. Or go to the hotel basement and inspect 1400 tons of gas cooling. It will be an ever-present comfort during their stay at the hotel.

SGA Area Construction Continues At All-Time High Levels

THE 14-state area comprising the region served by the Southern Gas Association is growing—as reflected in a survey of construction activity compiled for American Gas Journal by the F. W. Dodge Corporation, specialists in reporting construction information.

All types of construction in 1955 showed a 22.1 per cent gain over 1954, with public works and utility construction showing the greatest individual gain of 33 per cent, followed by a 22.8 per cent increase in non-residential construction and a 15.6 per cent gain in residential construction.

The outlook for 1956 is equally good. Reports from the various states indicate a continuing upward trend in construction contracts and number of jobs awarded. Overall, the dollar volume of business will continue to climb upward, with only a few areas reporting a slight decline or static level.

For this survey of current activity and trends, we asked the Dodge reporters to reply on four specific questions: outlook for 1956, most unusual feature of construction activity in their area, the trend of gas usage in comparison with competing energy sources, and the outlook for air conditioning and trends in this field.

The replies should be of great interest to the gas companies in the SGA area. New buildings—residential and non-residential—mean more customers, big and small. And customers are the lifeblood of the gas industry.

Individual state and area reports (except for New Mexico, which Dodge does not cover, and whose activity is generally reflected in that of Texas and Oklahoma) are as follows:

Virginia

—Thomas S. Phoebus, Richmond

Slow start on residential construction in Virginia during the first quarter seems almost certain to result in a smaller total volume this year than in 1955. Volume of non-residential building is below the first quarter of 1955, but the number of jobs awarded is on par with the previous year. Volume in this type of work is expected to increase in the next few months as a number of larger projects reaches the award stage.

Gas for heating seems to be the preferred fuel wherever gas is available. In many suburban areas, new developments are being located beyond the areas served by local gas companies.

Reasonable increase expected in central air conditioning systems being installed in above-the-lowest priced homes. Newer developments in air conditioning equipment will probably accelerate this rate of increase.

North Carolina

—James G. Bullock, Greensboro

Non-residential and heavy engineering construction will continue to increase in North Carolina in 1956. Residential construction is expected to continue to remain at the same level or slightly lower compared with 1955.

Industrial use of gas is on the increase in North Carolina, especially in the brick manufacturing industry. Residential use is also increasing but a lack of new pipe lines to residential developments is holding up a vast potential increase in the number of consumers. A number of new lines is under construction.

Air conditioning has become a "must" in offices and commercial buildings, storage houses, etc. Air conditioning of homes is also on the increase.

South Carolina

—Sam Roach, Columbia

Construction activity in South Carolina in 1956 is expected to be up in all fields except residential, where construction awards will probably be the same as in 1955 in volume and number of units constructed. Industrial construction—especially textile mills—and school construction are continuing at high levels.

Use of gas for space heating and other residential uses as well as industry utilization will continue to increase.

In the residential field a large per cent of the better type residences are being air conditioned and the trend is toward even more air conditioning.

Construction Activity in the Southern States for 1954-1955 — ($000)

State	Residential		Non-Residential		Public Works and Utilities		Total Construction	
	1955	1954	1955	1954	1955	1954	1955	1954
Texas	642,456	650,030	538,309	436,633	306,724	247,677	1,487,489	1,334,340
Louisiana	191,682	153,966	181,769	147,011	238,724	136,861	612,175	437,838
Mississippi	38,002	27,158	47,580	49,450	86,297	49,116	171,879	125,724
Alabama	106,713	86,076	112,536	84,232	100,648	69,303	319,897	239,611
Georgia	173,090	146,742	201,738	176,772	105,598	77,532	480,426	401,046
Florida	543,936	469,640	298,158	222,707	205,121	161,773	1,047,215	854,120
South Carolina	78,510	57,482	106,662	86,893	47,854	34,234	233,026	178,609
North Carolina	97,078	74,818	180,363	130,359	75,605	62,663	353,046	267,840
Tennessee	182,978	139,163	191,620	138,953	94,060	97,275	468,658	375,391
Oklahoma	146,040	139,657	121,116	104,542	166,568	65,533	433,724	309,732
Arkansas	41,497	48,321	51,295	43,854	45,774	54,831	138,566	147,006
Kentucky	168,358	122,326	91,515	124,247	114,980	96,716	374,853	343,289
Virginia	335,528	259,540	206,923	150,384	123,528	132,703	665,979	542,627
Totals	2,745,868	2,374,919	2,329,584	1,896,037	1,711,481	1,286,217	6,786,933	5,557,173
1955 increase in $	370,949,000		433,547,000		425,264,000		1,229,760,000	
% increase over 1954	15.6%		22.8%		33%		22.1%	

—Table courtesy of F. W. Dodge Corporation.

Kentucky

—J. J. Lawrence Mann, Louisville

All construction activity in Kentucky is continuing at an all time high so far in 1956 and, barring any unforeseen obstacles, is expected to continue at this good pace. Residential construction continues at an all time high and non-residential awards are again at a high level. Heavy engineering leads the field with the greatest increase over 1955. In spite of the tremendous volume of construction activity, many general contractors and sub-contractors are concerned over the low prices that are being bid on all types of construction.

Gas, where available, is the predominant fuel for both heating and cooking. And, it is being utilized by industry where available.

All-year air conditioning in the metropolitan areas, while not of great importance now, is gradually being accepted and in a number of instances is being utilized in the lower cost residential housing field.

Tennessee

—Dixon Gaines, Jr., Memphis

Construction activity in Tennessee in 1956 will probably remain at the same level as 1955. Residential construction will be slightly down while non-residential and heavy engineering is expected to be greater than 1955. Residential construction was 43 per cent lower in the first two months of 1956 as compared with 1955, but has picked up in the past few weeks and another good year is foreseen.

Use of gas, both in residential and industrial areas, is increasing.

Installation of all year 'round air conditioning was down somewhat in 1955 due to the mild summer. There was a slight increase however, in units installed and this is expected to increase in 1956.

The Southeast— Georgia, Alabama, Florida

—Mack Harmon, Atlanta, Georgia

Construction activity in this area in 1956 appears to have started with a bang! There has been no let up in all types of construction and increases over 1955 levels are evident. Barring unforeseen difficulties, this will be another record year in all areas — residential and industrial construction.

Continued surge of church construction of all denominations has made impressive advances with building designs varying from Gothic to Modern. There has been no let-up in school construction and this expansion will apparently continue for an indefinite period of time.

Use of gas for all purposes continues to increase and this trend is expected to hold true for the future as gas is made available in many new areas. The construction of several new pipe lines to this area will mean even greater utilization.

Air conditioning is now a virtual "must" in hospitals, office buildings, churches, etc. A few years ago, it was believed that air conditioning would by now be fairly common in residences, but the average home still does not have this feature.

Mississippi

—James R. Jones, Jr., Jackson

From all indications, 1956 will be another banner year for construction in Mississippi. To date, residential construction is up 49 per cent and heavy engineering construction is up 81 per cent over 1955 for the same period. Although non-residential construction is under last year at this time, it shows every sign of catching up and passing 1955 in future months.

Use of gas in Mississippi is increasing due to many new industries coming into the state plus the record breaking activity. As long as construction continues upward, the use of gas will continue to increase.

Installation of all-year air conditioning continued to increase during 1955. It is now a "must" for virtually all commercial buildings and in higher priced homes. It is gradually being used more in lower priced homes.

Louisiana

—S. J. Kupecky, New Orleans

State of Louisiana continues to grow in construction activity in all fields and is expected to increase in 1956. Biggest development appears to be in the industrial field with many new chemical and oil industry plants being constructed.

With ample gas being available, as Louisiana is a major gas producing state, it is being utilized for every conceivable purpose.

More air conditioning is being found in speculative building in the residential construction field, and more air conditioning installations are foreseen this year in commercial and industrial buildings.

Arkansas

—J. J. Orsini, Little Rock

With many new industries moving into Arkansas at a rapid pace, all types of construction continue to boom. As these new industries arrive there is a natural demand for more new housing, schools, churches, and commercial buildings.

With the increased costs of electricity, gas use is definitely on the increase. Cooking with electricity has gained to some extent, however, with the increased installation of all-year gas air conditioning the gas trend is expected to be upward.

All-year air conditioning is now being installed in the $10,000 to $12,000 residences. Main reason for this is that speculative builders find air conditioning one of the greatest aids in the sale of homes. For this reason the builders use less expensive building materials and allow for the cost of the installation of all-year air conditioning.

Oklahoma

—B. W. Querry, Oklahoma City

Residential construction in Oklahoma may surprise some economists and those who have foreseen a decrease in this type of construction. This is particularly true in the Oklahoma City area—one of the fastest growing cities in the nation. All other construction records for Oklahoma continue to tumble and 1956 should be another "banner" year.

Gas use in Oklahoma, which has a plentiful supply from its ample production, will continue to increase in new homes in the $15,000 and higher class group. Some 25 per cent are using electricity for cooking purposes and this percentage may increase, but electricity will not replace natural gas as a fuel for heating and cooking.

Winter and summer air conditioning was off to a slow start in 1956. This is expected to pick up immediately and by the end of 1956 should show a substantial increase of from 25 to 30 per cent gain over 1955. In homes costing $25,000 and over, nearly 90 per cent are air conditioned. Homes in the $12,000 or better class are either air conditioned, or have provisions for future air conditioning. Home owners are becoming more and more air conditioning conscious.

Texas

—A. W. Kitchens, Dallas

Construction awards for the first two months of 1956 were considerably ahead of 1955 and Texas is again hitting record levels of volume. This trend will probably continue for the balance of the year.

There is a very high demand for top quality commercial buildings, particularly office buildings. There is also a continuing trend toward construction of larger and better equipped homes in all price ranges.

Gas is almost universally used in Texas for residential and commercial heating and for many industrial purposes.

More and more air conditioning, especially year-round central systems, is being installed in homes. Practically all commercial and industrial buildings are air conditioned. ★ ★ ★

Sixth of a series

Communication:

Puff puff Dear mumble mumble In answer to your cough cough etc. . . .

Don't mumble or chew your words.

Twelve Tips on How To Dictate a Letter

Dr. Dennis Murphy

What Kind of Boss Are You?

All kinds of bosses are letter dictators:
Mumblers, and walkers, and window gazers,
Jinglers of money, and tobacco chewers,
Deleters who cut, and chronic stewers.
So the first thing you need to dictate a letter
Is a lovely gal who looks good in a sweater —
She can follow ideas, known and unknown,
Much better than any old dictaphone . . .

This is the beginning of some doggerel that burlesques a wolfish boss and his glamorous secretary. But a recent survey shows that most American businessmen today prefer a secretary who shows **initiative** in her work, the ability to type quickly and accurately, the ability to file and find information speedily, a winning telephone manner, punctuality, and personal neatness. Instead of ravishing beauty and disturbing sex appeal, most bosses prefer somebody who can "manage the office" while they are away.

The Correspondence Team

Some managers write their letters in longhand rather than dictate, even when a good secretary is available. Often they feel self-conscious or fear they can't dictate intricate material very well. They need this training and practice, however, because any great quantity of written communication—memos, letters, and reports — is nearly always the result of teamwork.

Any correspondence team can achieve cooperation if the boss trains his steno-secretary fully and if she tries to reproduce his thoughts faithfully. Each must understand the work of the other. Don't waste time to dictate anything that is already printed, typed, or handwritten. And don't dictate faster than about 80 to 100 words a minute until your helper gets used to your manner; an even dictation that is clearly understood is always better than spurts at break-neck speed.

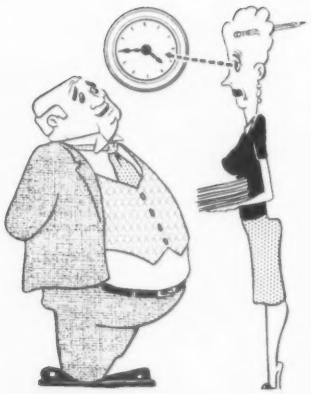
Twelve Tips

1. **Plan a regular dictation period.** Early morning usually affords freshness and few interruptions, but emergency dictations may bob up any time. A poor boss will dawdle away the entire day, call his stenographer 30 min before quitting time, dictate a day's typing, and expect her to finish it that day. Are **you** that kind of thoughtless boss?

2. **Read your first-class mail carefully.** Work as a team with your stenographer. Train her to open, read, sort, and stamp your mail and to answer routine letters.

3. **Tackle your most urgent letters first.** But if an important decision must be made, consult the proper sources, sleep over it, and take time to word it right.

Type those up and get them out this evening, Miss Smith.



Plan a dictation period—don't leave it to the last minute.

4. **Pencil notations on the letter you receive.** Indicate roughly your main points and number them in the order you plan to answer them. Get all your facts ready.

5. **Never repeat, word for word, the letter you receive.** This needless repetition is the biggest farce in the art of dictation! Identify the letter accurately by date, file number, or subject. Here are two good opening sentences that immediately help to set up your purpose: "Thank you for your letter of March 12 asking about the quarterly report." "Please refer to your letter of September 15 concerning the API meeting." *Re:* and *In re:* are old-fashioned. But never get into such a rut that all your letters sound alike; try to personalize each one.

6. **Set up your purpose** in the first paragraph. Make it brief. Develop each point in a later one. Cultivate a method in your work that will put your helper at ease.

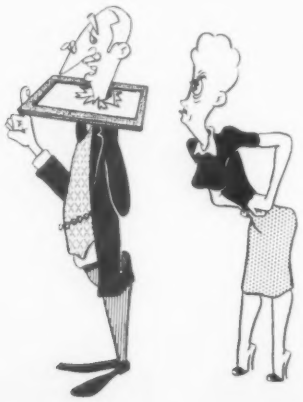
7. **Dictate in your natural speaking voice.** Enunciate carefully and clearly. Keep an even speed, and talk as though your addressee were seated across from you.

8. **Avoid personal peculiarities.** Don't mumble or chew on your words, stroll around the office, gaze out of the window, jingle money or keys, or let your sentences fade away inaudibly — and expect any helper to come up with accurate copy. Don't dictate with gum, a pipe, cigar, or cigarette in your mouth. If you have whistling dentures or body odor or halitosis — do something about it!

9. **Help your stenographer-secretary** by pointing out unusual spellings, punctuation marks, quotations, underlining, spacing, and the like. Train her to search for the best forms of composition, and cooperate with her toward perfection. Thank Heaven if your helper is intelligent, resourceful, and accurate — but praise her!

10. **Equip yourself** with a knowledge of grammar, word usage, and sentence structure. Otherwise, how will you know whether your helper is doing her job correctly?

Tut tut, Miss Smith, if it's too fast just say so.



Enunciate carefully and clearly—keep an even speed.

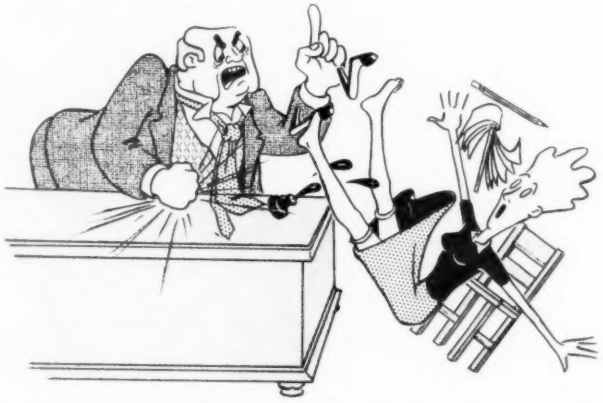
11. **Listen carefully** when she reads your dictation back to you. **Train your ear** to catch redundancies, repetitions, jerky cadences, harsh sounds, and awkward phrases. Teach her to do the same. Give her authority to improve your writing without changing the content and meaning.

12. **Read her typewritten copy carefully before you sign it.** Glaring errors often show up in this final check. If this copy isn't exactly as you desire it, make the necessary revisions. Then courteously ask her to retype your letter. Aim to get everything right the first time, for you are the one who is finally responsible. So, always read before you sign.

Please Take a Memo!

To simplify intracompany communication, try to keep all of your writing at a minimum. You can pen or pencil a note to one other person, but you'll need to dictate a memorandum if two or more readers are concerned. Be sure that all the persons involved get a copy. And, train your steno-secretary to *date every memo.*

The first thing any reader wants to know when he picks up your memo on his desk is: What is it? Who sent it? Why?



Talk as though your addressee were seated across from you.

1. **Let your reader know at once what it's about.** A descriptive title will help.

2. **Use subtitles** if your memo runs to several paragraphs.

3. **Highlight the essentials** by placing them first, by numbering each item, and by underlining key words.

4. **Keep your memo brief.** The shorter it is, the better are its chances of being read. You can shorten your memo by half if you use an outline style, shrink your sentences, and cut out repetitions. Don't let your memo run over one page. Half a page is better. Once your office helper understands this routine, she can type your memos in a jiffy.

Summary

1. **Dictate with simple words.** One or two long words (of three or more syllables) are enough in a sentence.

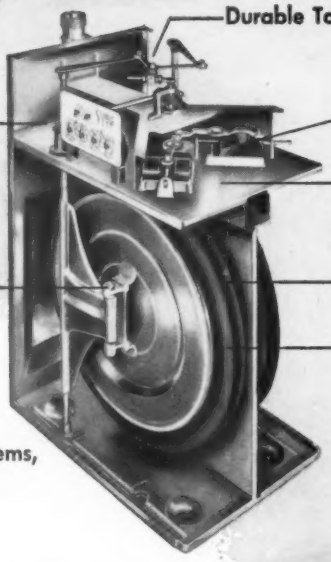
2. **Dictate with short sentences.** Hold the average to 20 words or under.

3. **Dictate with regular phrases.** Pause at the end / of a complete unit of thought / before going on to another unit.

4. **Dictate for brief paragraphs.** They are easier and more restful for tired eyes to read.

5. **Train your steno-secretary** to "run your office" smoothly while you are gone. ★ ★ ★

Low Maintenance?



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Spot-welded diaphragm rings

High quality, specially treated diaphragms

Accurate assembly methods, supervised by modern quality control systems, assure minimum wear, noise and friction

• • • EITHER YOU BUY IT BUILT IN • • •

OR YOU DON'T GET IT AT ALL!

Low meter maintenance is easy to take for granted. A meter you buy today will not cost anything at all for maintenance for 6 to 10 years. Even then it will be difficult to tell which brand of meter saves that extra few minutes in the repair shop . . . which meter best resists the effects of wear and age on valves, diaphragms, tangents, and other vital parts . . . which meter is capable of running another period or another generation without losing revenue or costing too much for maintenance.

However these points are the most vital considerations in your selection of meters.

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GAS METERS

SU-2

Southern companies' annual reports show net returns up 9 per cent over 1954 . . . Construction held its own in 1955 and plans are for 10 per cent rise in 1956

Natural Gas Utilities in the South Follow Upward Trend

Ernestine Adams

USE of natural gas in the South continues to gain. Selected natural gas companies* showed a 6.4 per cent increase in operating revenues and a 9 per cent advance in net returns.

The gross sales gains may be slightly below overall economic increases in this region but the consistent showing of all companies is encouraging.

Only one utility, Mobile Gas Service, had less operating revenue and that was the result of a technical change. United Gas took over some industrial accounts and paid Mobile for delivery. The company's net income was up 14 per cent.

Out of the 22 annual reports of southern gas utilities surveyed in this article, only 3 showed a drop in net returns compared to 1954 (Table 1). United Gas had a 2 per cent decrease in 1955. This was attributed to increase in cost of gas, addition of 291 employees and a general wage increase, employees stock purchase plan fund, etc.

Houston Natural Gas, which had 10 per cent less net income than in 1954, laid it simply to the fact that expenses increased in greater percentage than revenues.

Piedmont's 21 per cent decline is mainly an income tax feature. "After eliminating the effect on net income of estimated income tax reductions resulting from the carry over of prior year operating losses, net income" has an increase of 22.5 per cent.

*Those covered in "Natural Gas Rises With the South," May, 1955, Page 12, which are also in this survey.

NET GAINS SUBSTANTIAL

On the other side 7 companies had 20 per cent or more gain in net returns. Arkansas Louisiana Gas Company more than doubled its net income. Mid-South Gas Company, Gas Light Company of Columbus, East Tennessee Natural Gas, Southern Union Gas, and Atlantic Gas Light were others with high net gains.

Operating revenues did not take as steep a climb. Union Gas System showed 33 per cent gain; Pioneer Natural Gas was 24 per cent up, and Gas Service Company rose 20 per cent.

Last year the group made 6.2 per cent net on its overall operating revenues. This year indicated greater efficiency of operations with net income 8.9 per cent of operating revenues.

CONSTRUCTION PLANS

New capital investment in 1955 barely held its own with 1954 expenditures for property, plant and equipment. Indications are that 1956 will see a decided gain in capital expenditures. A rough estimate would be 10 per cent expansion in new plant this year.

Arkansas Louisiana Gas Company

Price of purchased gas has gone from approximately 4 cents per 1000 cu ft in 1949 to 10½ cents in 1955 for one company.

Piedmont Natural Gas plans a $2,500,000 construction program in 1956; the company spent $1,717,804 in 1955 on improvements. Atlanta Gas Light Company spent $6,949,107 in 1955 on construction, the largest in its history, and expects to spend $7,400,000 during 1956. Pioneer Natural Gas Company has extensive additions and improvements in progress. Mobile Gas had $977,000 expenditures in 1955 for construction and $1,140,000 is the 1956 estimate.

Each company had its own problems and triumphs. These were shared with the stockholders in the annual reports. Following are thumbnail sketches of financial and operating standings:

ALABAMA GAS CORPORATION

This year marked the end of selling coke oven gas. Only natural gas will be used in Alabama Gas Corporation's distribution system in Birmingham and other towns.

"The end did not come about suddenly," said the report. "While service of natural gas to a few industries was commenced in 1931 it was not until 1946 that an upsurge of demand for gas in excess of available supplies of coke oven gas necessitated the conversion of a segment of the system to the distribution of natural gas. In all but one of the years which have passed since that time it was necessary to convert additional sections in order to meet the steadily increasing demand for gas fuel. Finally . . . the company completed the conversion program."

This year the company added 8657 meters to make a total of 194,683 in service. Net income was 8 per cent of the total revenue and 5.7 per cent of net plant assets.

ARKANSAS LOUISIANA GAS COMPANY

The annual report reveals what happens when rates are slowed, states Arkansas Louisiana Gas Company, Shreveport, Louisiana. "The period

1950 to 1955 saw gross revenues doubled due to increased sales volumes and higher rates, but the cost of 'raw materials' alone required to produce these revenues tripled, and net income increased by only one-fifth. Getting new rates into effect is inherently slow because of regulatory processes, and early in 1955 it became evident that rate increases alone would not return earnings to a level that would provide an adequate financial position as soon as required. In view of this, the company set out to reduce all expenses possible and to operate on an austerity basis in order to offset partially the steady reduction of earnings.

"The program was initiated about the middle of the year and much has been accomplished. The 2189 employees at the beginning of the year had been reduced to 1843 by the end of 1955."

The company now serves 148 communities and 243,649 customers, 9777 more than in 1954. It buys natural gas at 10.6 cents (up from 9.95 cents last year) and sells it at 52.2 cents average per Mcf to residential customers; 40 cents to commercial customers and 16.8 cents to industrial customers. Amount used by the average residential customer in 1955 was 95,560 cu ft. This is higher than it has been since 1951 when the average was 97,990 cu ft.

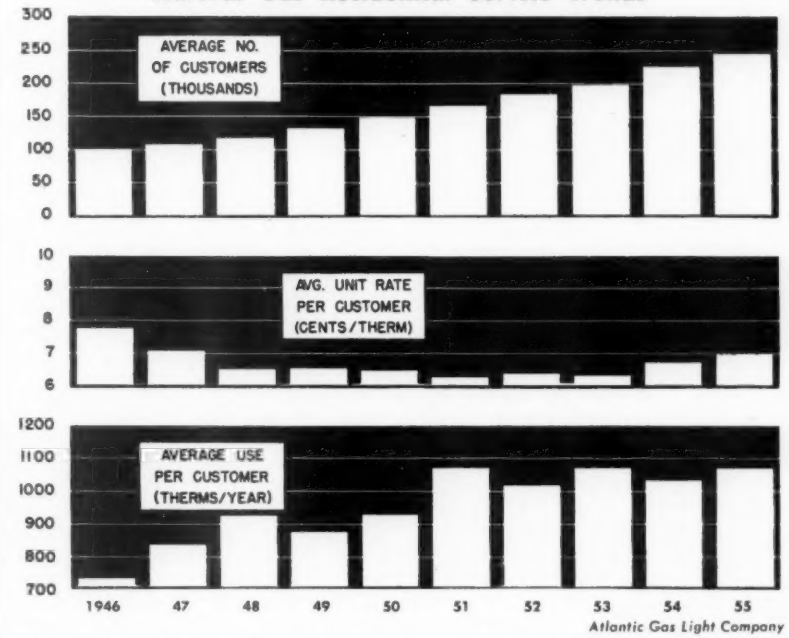
Net income, a new record, is 8.7 per cent of the gross operating revenues and 5.7 per cent of net plant and property.

ARKANSAS WESTERN GAS COMPANY

The Fayetteville, Arkansas, company's intensive sales campaign is reflected in these items in its annual report: "The company has a dealer financing arrangement whereby dealers are in a position to sell to the company their time-payment paper on gas burning equipment. This arrangement affords every dealer an opportunity to finance his installment paper and many dealers are availing themselves of this plan.

"For many years the company has maintained hospitality rooms in Fayetteville and Harrison. These rooms are a combination auditorium, gas appliance display center and community meeting hall that are made available by the company, without cost, to any accredited club or organization desiring their use for non-profit functions. Day-to-day bookings of these rooms indicate that they are invaluable to the company as public service projects."

Total of 1109 customers were added to keep up the steady increase over the years. Net income was 21.9 per cent of total revenue and 5 per cent of the utility plant in service at original cost.



An interesting pattern of one company's experience is shown in this graph. Number of customers has risen steadily since 1946. Rates reached a minimum in 1951 and use seems virtually static since that year.

ATLANTA GAS LIGHT COMPANY

This is Atlanta (Georgia) Gas Light Company's 100th year and it promises to be a record one. Last year's $6,949,000 construction expenditures were the largest in history; this year the figure is estimated at $7,400,000. Some 19,484 customers were added.

The residential customer used an average of 1071 therms* at 6.98 cents per therm compared to 1034 therms at 6.76 cents per therm in 1954.

Net income was 5.6 per cent of operating revenues and 3.5 per cent of gross value of utility plant.

CHATTANOOGA GAS COMPANY

This Tennessee firm has been going out after new business. Read its report:

"In Chattanooga, as in other cities our size, there is a definite shift of new housing developments into the outlying areas of the community. For many years our competitors have had a virtual monopoly on all new housing construction. With natural gas available in Chattanooga your company is in a position to compete for this business. In the past two years we have extended our gas mains into 5 real estate developments with a total of 197 housing units, of which 130 have used gas for heating, cooking, refrigeration or water-heating. Our distribution lines have also been extended into another development which is expected to contain 250 housing units when complete."

*One therm = 100 cu ft of 1000 Btu.

Net income was 4.8 per cent of operating revenue and 3.3 per cent of gas utility plant at original cost.

CONSOLIDATED GAS UTILITIES CORPORATION

Consolidated Gas, Oklahoma City, continues to stress customer service as many other utilities do. Mentioned in its report are several methods of aid to customers:

"An analysis of the gas sold for space heating indicated that some consumers delay starting their automatic burners early at the onset of the heating season. Free pilot lighting service to those who desired it and an advertising campaign were therefore instituted to minimize this delay.

"New and improved customer record systems were installed in several of the larger offices during the year to facilitate and speed record keeping and handling of requests for gas service. Also, in a number of locations, a system of 2-way radio communication has been established for expediting consumer service calls and to increase the operating efficiency of the service department. At the main office, an IBM electronic computer automatically performs invaluable service in billing, inventory and payroll control."

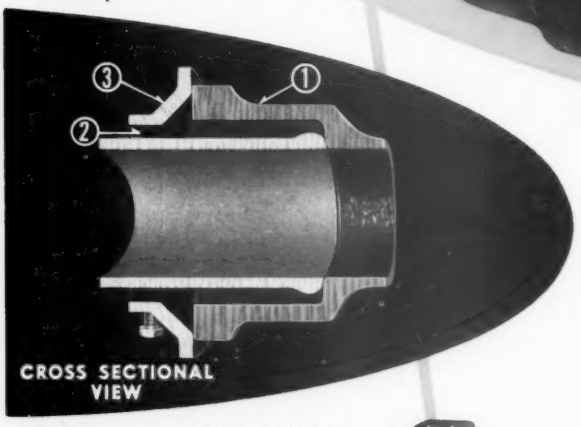
Net income for 1955 was 9.1 per cent of operating revenues and 3.4 per cent of original plant cost.

EAST TENNESSEE NATURAL GAS COMPANY

An interesting analysis of expense and revenue is given in the report of East Tennessee of Knoxville.

Simplified Bell Joint Clamps

1. Bell joint
2. Perma-Seal Compound
3. Bell joint clamp



SEALED BY ADHESION

WITH PERMA-SEAL COMPOUND

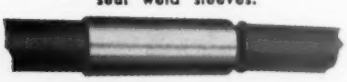
WITH THE FOLLOWING ADVANTAGES:

- Smaller street openings required because no excavating or cleaning necessary in back of the bell.
- The clamp does not require adjustment, or filling and facing of the bell.
- ***The clamp is engineered to fit all variable pipe wall thicknesses without adjustment and to fit all types of bell joints including sleeves, drip pots, valves and odd size pipes.*** Available sizes: 3" to 36" diameter.
- This clamp fits in confined areas because it requires no greater area than the existing bell for installation.
- ***This leak clamp becomes a seal by adhesion rather than by compression.***
- This clamp allows ground movement and vibration to take place without the danger of leaks after installation.
- Once installed the joint becomes trouble-free and permanent.

Write: for full information and prices about the Newest Method in Pipe Connections

New Perma-Seal and Safety Seal Weld sleeves available for steel to steel, steel to cast iron, split sleeves for repair of steel pipe, and completely insulated sleeves for corrosion control.

Typical installation in the removal of valve and replaced with safety seal weld sleeves.



Steel to steel sleeve

Cast to cast sleeve

UNITED PIPE UTILITY SUPPLIERS, INC. BOX 777, BELOIT, WISCONSIN

Ratios of Expenses and Net Income to Revenues

	1955		1954	
OPERATING REVENUES	$16,498,355	100 %	100 %	$14,407,793
Purchased Gas	$11,763,219	71.30%	69.97%	$10,080,767
Taxes	1,527,164	9.26%	8.86%	1,276,224
Depreciation and amortization	860.088	5.21%	5.90%	850,628
Other operations and maintenance	687,156	4.16%	4.73%	681,652
Income deductions — net	723,938	4.39%	5.41%	779,192
Net income	936,790	5.68%	5.13%	739,330

Net income as shown is 5.68 per cent of operating revenues. It is 3.8 per cent of net gas plant.

EMPIRE SOUTHERN GAS COMPANY

Domestic customers averaged 89,300 cu ft of gas each in 1955 compared to 85,500 cu ft in 1954 and the number had grown by almost 1000. Empire (Fort Worth, Texas) expects 1956 to show greater gains. States its report:

"It is anticipated that operating results for 1956 will show some improvement over those experienced in 1955. . . . A full season of irrigation will be served in 1956 and the number of pumping units connected to our gas system is increasing each month. This revenue, not received in 1955, will assist in a 1956 improvement."

The firm's net income was 6.8 per cent of its net property in 1955 and 16.9 per cent of the operating revenue.

GAS LIGHT COMPANY OF COLUMBUS

Weather played a part in this Columbus, Georgia company's growth. States the report: "Because of a good heating season during the past winter and because we were able to reduce our operating expense per average customer during a year of stepped-up expansion, our earnings show a substan-

TABLE 1. FINANCIAL STATISTICS FOR YEAR 1955 TAKEN FROM ANNUAL REPORTS OF SOUTHERN GAS COMPANIES

Company	Operating Revenues 1954 ($1000) Residential	Commercial	Industrial	Total[1]	Operating and Other Expenses ($1000) Natural Gas Purchased	Depreciation (depletion)	Taxes	Number Shares ($1000) 1st Common 2nd Preferred	1st Price/Share 12/31/54 2nd Dividend/Common Share	Net Fixed Assets ($1000) 1st 1955 2nd 1954	Working Capital ($1000) 1st 1955 2nd 1954	Long Term Debt ($1000) 1st 1955 2nd 1954	Capital Expenditures ($1000) 1st 1955 2nd 1954	Net Income ($1000) 1st 1955 2nd Per Cent of 1954
Alabama Gas Corp.[2]	$14,610	$3,081	$5,744	$ 24,161	$10,844	$ 1,120	$ 3,264	$ 925	$ 36½	$34,224	$ 627	$ 18,173	$ 4,153	$ 1,966
Per cent of 1954	108%	99%	110%	107%	113%	109%	100%	29	1.28	32,760	(53)	17,531	4,084	115%
Ark.-Louisiana Gas Co.	10,363	3,356	22,396	38,674	17,855	3,874	5,000	3,802	18¾	76,072	4,219	35,000	4,605	4,298
Per cent of 1954	115%	116%	123%	119%	109%	101%	216%	None	0.50[3]	76,066	6,766	40,000	10,664	237%
Arkansas Western Gas Co.	1,613	645	286	2,575	120	303	418	434	18	8,438	258	4,225	1,000	570
Per cent of 1954	107%	110%	111%	108%	126%	104%	101%	None	0.90	7,692	854	3,708	500	115%
Atlantic Gas Light Co.[2]	18,334	4,650	13,310	36,795	22,596	1,146	3,354	882	28⅛	51,089	(4,702)	22,874	6,949	2,086
Per cent of 1954	115%	116%	97%	107%	106%	112%	127%	50	1.25	45,373	178	23,345	5,893	120%
Chattanooga Gas Co.[5]	1,287	886	2,377	4,578	2,803	161	412	650	6	5,663	(82)	3,888	404	219
Per cent of 1954	109%	114%	108%	109%	120%	90%	103%	None	None	6,607	73	3,997	554	108%
Consolidated Gas Utilities[6]	3,979	1,133	3,097	10,394	4,638	622	815	886	12⅜	28,162[4]	473	8,442	1,773	944
Per cent of 1954	105%	114%	97%	105%	111%	95%	106%	None	0.75	28,592[4]	790	8,981	960	106%
East Tennessee N. Gas Co.				16,498	11,763	858	1,527	1,079	10¾	24,630	(284)	16,272	560	937
Per cent of 1954				115%	117%	101%	120%	190	0.60	25,437	(81)	17,283	606	127%
Empire Southern Gas Co.	1,138	319	569	2,276	456	183	527	207	25	5,686	695	2,623	688	386
Per cent of 1954	109%	93%	109%	107%	110%	104%	117%	None	1.00	5,218	236	2,123	644	111%
Gas Light Co. of Columbus[5]	1,635	294	963	2,941	1,528	105	411	125	17½	5,225	(313)	2,876	649	274
Per cent of 1954	116%	114%	111%	114%	114%	148%	125%	18	0.90	4,731	(485)	2,332	394	131%
Gas Service Co.	49,560[13]		11,648	61,248	35,962	1,852	7,567	1,500	25¾	59,841	(3,539)	52,812	6,058	2,781
Per cent of 1954				120%	133%	110%	109%	None	1.36	55,450	(3,340)	48,923	5,557	100%
Houston Nat'l. Gas Corp.[7]	9,114	2,064	3,404	15,150	5,037	1,242	2,025	496	25	29,287	1,834	18,885	3,400	1,151
Per cent of 1954	107%	108%	87%	102%		113%	92%	160	1.00	26,638	1,050	16,345	3,879	90%
Lone Star Gas Co.	38,860	8,450	13,813	71,798	18,013	10,244	15,578	5,514	28⅝	222.714	(1,596)	110,000	23,949	12,683
Per cent of 1954	110%	110%	113%	112%	108%	110%	132%	179	1.40	209,404	6,766	110,000	24,632	117%
Mid-South Gas Co.[15]	2,558	900	543	4,122	1,891	268	585	465		8,571	(240)	5,554	405	334
Per cent of 1954	119%	117%	100%	115%	109%	108%	143%	None		8,418	(278)	5,744		171%
Mobile Gas Service	2,539	761	1,593	5,307	2,536	186	799	240	24	8,333	132	38,55	977	486
Per cent of 1954	111%	107%	32%	66%	45%	111%	123%	17	0.90[9]	7,552	797	3,970	1,173	114%
Nashville Gas Co.[11]	3,118	1,895	1,704	6,779	3,315	295	1,153	10		12,778[4]	(329)	5,228	869	481
Per cent of 1954	107%	113%	112%	110%	118%	110%	103%	15	32.50[13]	11,955[4]			749	101%
Okla. Natural Gas Co.	18,167	5,446	10,869	38,478	8,863	4,297	6,646	2,526	23⅜	108,431	(11,104)	51,919	8,939	5,355
Per cent of 1954	104%	101%	107%	102%	89%	112%	115%	335	1.20	113,073	(4,733)	55,508	10,724	110%
Piedmont Natural Gas Co.	2,691	1,531	1,910	6,599	2,591	383	800	415	15	13,547	(388)	11,292	1,718	603
Per cent of 1954	115%	109%	118%	114%	120%	109%	151%	None	None	12,488	(458)	11,726	1,409	79%
Pioneer Nat'l. Gas Co.	5,997	1,833	2,333	14,398[9]	3,551	1,111	2,203	1,456	28¼	37,040	3,807	23,000	10,705	2,753
Per cent of 1954	113%	112%	109%	124%	150%	127%	109%	None	1.24	27,028	2,834	15,000	4,741	110%
Southern Union Gas Co.	27,833[10]			31,659	11,335	1,937	3,421	2,029	24¼	62,436	(1,705)	27,595	8,688	4,025
Per cent of 1954	117%	116%	119%	117%	123%	110%	132%	148	1.00	58,994	468	27,036	6,803	122%
Union Gas System[5]	2,649[13]		1,258	4,071	2,018[14]	262	332	87	21	4,281	948	2,886	675	254
Per cent of 1954	134%		131%	133%	182%	108%	101%	7	1.00	2,933	500	2,334	552	105%
United Gas Corp.	26,651[13]		61,917	239,849	96,633	29,805	22,423	12,885	31½	520,940	49,370	335,324	47,595	26,156
Per cent of 1954	108%		135%	111%	114%	114%	124%	None	1.50	500,109	42,556	306,280	9,426	98%
Western Kentucky Gas.	4,198	1,150	1,081	6,432	3,470	319	613	351	14	9,359	(738)	6,185	1,800	487
Per cent of 1954	108%	108%	147%	113%	114%	123%	107%	14	0.60	7,921	(36)	4,368	1,422	125%

( ) Minus figure.
[1]Total includes sales to other public utilities, to pipe lines, etc.
[2]Fiscal year ends Sept. 30.
[3]Plus 10% stock dividend.
[4]Gross.
[5]Fiscal year ends Aug. 31.
[6]Fiscal year ends Oct. 31.
[7]Fiscal year ends July 31.
[8]Plus 1 for 4 stock dividend.
[9]Includes $3,606,000 for irrigation.
[10]Total to consumers; remainder for resale.
[11]Subsidiary of Tennessee Natural Gas Lines.
[12]Paid to Tennessee Natural Gas Lines on 10,000 shares.
[13]Includes commercial sales.
[14]Includes royalties.
[15]An interim report with new fiscal year ending April 30 when annual report will be made.

tial gain over 1954. We have maintained our existing dividend payments and have reinvested our remaining earnings in new plants to serve additional customers in our community who desire the comfort, efficiency and economy of natural gas.

"Shortly after the end of the fiscal year we passed the milestone of 30,000 meters. We served less than 14,000 meters in August, 1948, when we began operating the company."

Returns were 9.3 per cent of gross income and 5.2 per cent of plant at depreciated cost.

GAS SERVICE COMPANY

This firm, with home offices in Kansas City, Missouri, distributes in Missouri, Kansas, Oklahoma, and a couple of towns in Nebraska. In 1955 a good year was recorded. Five new towns and 23,483 new customers were added. With revenues up 20 per cent, however, net income barely held its own with the 1954 figure.

Among the reasons is this one set forth in the annual report:

"As city occupation or gross receipts taxes are based on a percentage of gross operating revenue, the increase in gas rates required an additional accrual to cover these taxes. General property tax increases were due to increased rates and additional property assessed."

Net income was 4.6 per cent of net fixed investment and 4.5 per cent of operating revenues.

HOUSTON NATURAL GAS COMPANY

Operating in the Texas Gulf Coast area, Houston (Texas) Natural Gas was among the few with net income less than last year. At $1,151,000 profits were off 10 per cent. This was attributed to higher cost of doing business.

Gas purchases were nearly 50 per cent of total operating expense and more was spent "in serving new customers, seeking new business, and keeping natural gas abreast of other fuels in a highly competitive market. Increased provisions also were made for depreciation and depletion."

This firm had 15,888 new accounts but industrial sales were off more than half a million dollars, or 13 per cent. Overall gross income was up 2 per cent in spite of this.

Net income was 3.9 per cent of net fixed assets and 7.6 per cent of operating revenues.

LONE STAR GAS COMPANY

All operational figures were up from last year for this company with headquarters in Dallas, Texas. The 1955 report points out that only long term planning enabled the organization to meet the accelerated pace of growth and development throughout the area it serves. During the year, 42,945 customers were added, making 756,235, which is double the number served 10 years before.

For this year net earnings were 14.5 per cent of operating revenues and 5 per cent of net property, plant and equipment.

Although Lone Star is a natural gas producer, more than $18,000,000 was paid for gas and $2,970,647 was paid in royalties.

Major revenue was from resale of gas. Below are amounts and income:

	MCF	Thousand Dollars	Per MCF
Residential	49,115	$38,860	$ .79
Commercial	12,681	8,450	.67
Industrial	62,677	13,813	.22
Electric generation	43,848	5,595	.13
Transmission utilities	19,952	2,637	.13
Field	14,049	2,281	.16

MIDSOUTH GAS COMPANY

A very brief report was made at this time by the Little Rock, Arkansas, firm. Approval has been obtained from the Arkansas Public Service Committee and FPC to change to a fiscal year ending April 30.

MOBILE GAS SERVICE CORPORATION

This Mobile, Alabama, firm gave prosperous conditions and greater demand for gas credit for its improvement:

"The excellent record of growth experienced by the company continues as a result of the expansion of industrial and other business activity. These good business conditions and an increase in demand for all types of gas service are reflected in improved earnings of the company," stated the report. The company's gross revenue was down because industrial customers were assigned to United Gas Pipe Line but delivery charges made up for any loss of profit.

Net income was 9.2 per cent of gross and 4.8 per cent of utility plant at original cost.

With degree days only one day more in 1955 each residential customer used a little more gas 71,700 cu ft to 70,800 cu ft in 1954 but paid the same per Mcf, 76 cents.

NASHVILLE GAS COMPANY

Nashville Gas Company, subsidiary of Tennessee Natural Gas Lines, Nashville, Tennessee, gives an interesting 10-year condensed table showing virtually uninterrupted growth in customers, gas sales, revenue, net income, and taxes. Total taxes show some signs of slowing in expansion: In 1946 they were 3 times net income; in 1955 taxes were only 2.4 times net income. It still seems pretty drastic taxing.

The company reports success with its rental plan: "In 1953 the company inaugurated a rental water heater plan that enabled customers to have the advantage of the use of modern gas water heaters at a nominal monthly rental.

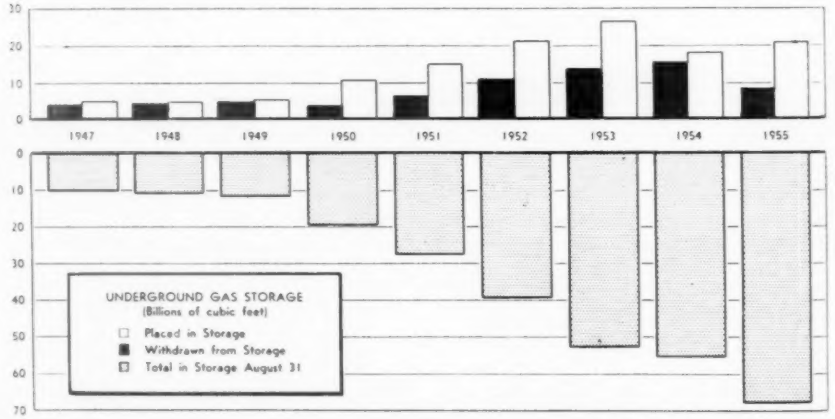
"By means of this plan we have added a great many customers whom we would not have been able to obtain on any other basis. The number of water heaters rented during the year increased from 363 in 1954 to 588 in 1955, or 62 per cent. This brings the total rental water heaters on our line as of December 31 to 1201."

OKLAHOMA NATURAL GAS COMPANY

This company's annual report uses a graph and word description to explain the importance of underground gas storage to its stockholders.

"Underground gas storage is continuing to be increasingly important for conservation of gas and meeting wide variations in load. Volumes of gas in storage were appreciably increased during the past year, and the functioning of all facilities has been excellent," reports the board.

"Since underground storage is so important to company operations, it is well to restate its principal purposes.



Oklahoma Natural Gas Company

The importance of underground storage is commonly acknowledged in annual reports. Instant service is assured by the constantly growing supplies of gas stored away for effective response to peaks in demand.

1. To meet peak sales requirements during high demand periods.
2. To conserve gas that might otherwise be wasted.
3. To improve the system load factor."

Net income was 13.9 per cent of operating revenues and 4.7 per cent of net fixed assets. The company's headquarters are at Tulsa, Oklahoma.

PIEDMONT NATURAL GAS COMPANY

Steady growth was indicated by Piedmont's (Charlotte, North Carolina) report, which read: "Customers continue to be added at a satisfactory rate. The number served at December 31, 1955, was 44,788, an increase of 2214 over 1954.

"Since the introduction of natural gas in 1952, the average annual use per residential customer has increased from 23,200 to 43,700 cu ft in 1955, an 88.4 per cent increase. This is the result of a very active sales department which sold during the year 3892 gas-burning appliances. The encouragement of appliance dealers particularly in the field of commercial appliances along with the company's activities have resulted in new peaks being set in the commercial field that now represents 11.9 per cent of the total sales volume."

Use and revenue per residential customer for the last four years were:

	1955	1954	1953	1952
Gas used (MCF)	43.7	38.2	29.4	23.2
Revenue	$79.48	$71.99	$61.08	$53.36
Revenue/MCF	$ 1.82	$ 1.89	$ 2.08	$ 2.30

Net income was 9.1 per cent of operating revenues and 3.6 per cent of gross utility plant investment.

PIONEER NATURAL GAS COMPANY

Pioneer Natural Gas, Amarillo, Texas, added 7784 residential customers in 1955 and to take care of them and future new customers spent $11,320,000 in additions and improvements. This was an all time high in investment and it will be followed this year with another $8,616,000 expenditure.

According to the annual report, the company organized a new business department to "cooperate with the manufacturers, distributors and dealers in actively promoting the sale of modern gas equipment. This department also works closely with architects, builders and contractors."

Net income was 18.1 per cent of total revenues and 7.4 per cent of net property, plant, and equipment.

SOUTHERN UNION GAS COMPANY

Turning in its usual good performance, Southern Union (headquarters, Dallas, Texas; area Texas Gulf Coast and West Texas, New Mexico, Arizona, and South Colorado) increased operating revenues 17 per cent and net income 22 per cent. Net income was 12.7 per cent of operating revenues and 6.4 per cent of net fixed assets.

The importance of people in the organization is stressed in the annual report. Under "Personnel Resources" is the following statement:

"The company deems it essential that continued emphasis be placed on employee training and education, within the areas covered by individual jobs and responsibilities. The highly competitive situation in which the gas industry finds itself today lends increasing importance to a sustained training program. Each employee, as a member of the gas industry team, can do much to help sell the public in what is today recognized as a "battle of the fuels."

"Southern Union gives extensive attention to far-reaching programs for personnel, with emphasis on the techniques of supervision and on the broad field of human relations. Much stress is placed on the area of employee-customer contact—the basic concept hinging on the realization that each of its 1750 employees is an important public relations representative of Southern Union."

UNION GAS COMPANY

This firm, with head offices in Independence, Kansas, has an interesting page of "Questions and Answers" in its annual report. A selection of questions sent in by stockholders is answered by the company. One asks for background of directors; another wants to know why the company sells LPG.

Union Gas meets rising cost with action:

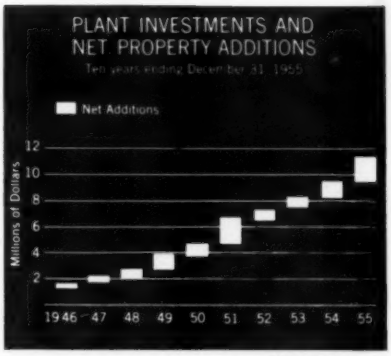
"With the mounting cost of gas we have accelerated our leak detection work by assigning full time personnel specifically to this program. During this fiscal year a total of 1829 leaks were found and repaired. This program has required additional funds in distribution line replacements over and above previous years and the current thinking of management is to continue to accelerate this effort in the hope that our line loss in the future can be materially reduced."

Last year's net was 4.4 per cent of the gross income and 5.9 per cent of the net plant investment.

UNITED GAS CORPORATION

A giant company, United Gas, Shreveport, Louisiana, has considerable income from crude oil, sulfur and potash; however, natural gas sales make up 80 per cent of the operating revenue.

Although net income was down 2 per cent from last year, it was 10.9 per cent of the operating revenues (which were up 11 per cent) and it was 5 per cent of net property assets.



Western Kentucky Gas Company

Net additions for individual companies vary widely from year to year, yet the overall picture is one of rising expansion and increased yearly investment in plant construction.

United's research activities are of value. Stated the report:

"Principal research activities during 1955 concerned high speed computers, corrosion research, instrumentation and field testing of the new wellhead dehydrators and gasoline recovery units.

"Applications of automation now under investigation include mechanically integrating orifice meters, electronic reading of orifice meter charts, data-processing methods for distribution billing and printing devices for domestic meters. One mechanical integrator has been designed and a model is being tested.

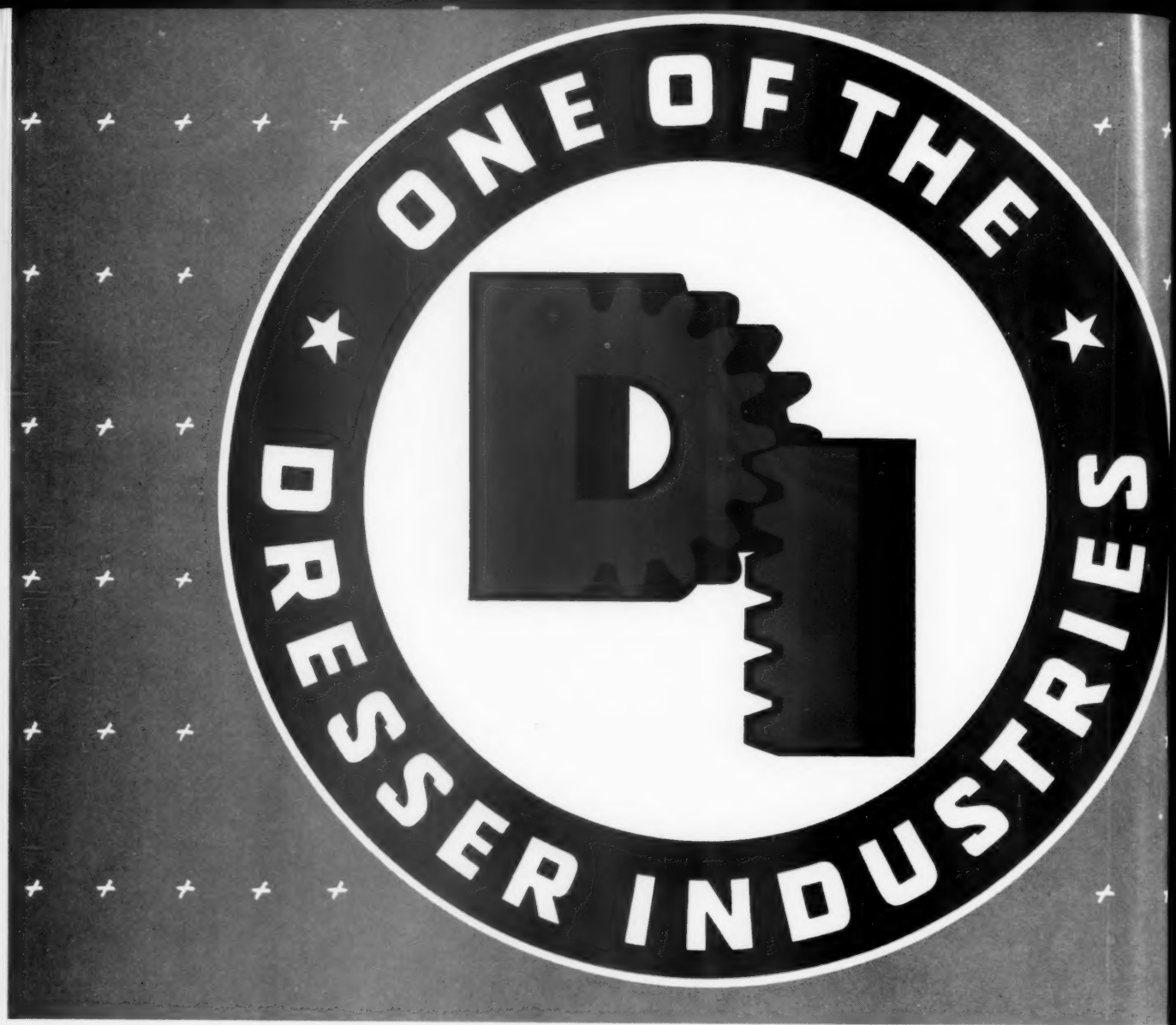
"An adequately equipped and instrumented test set-up for checking performance of natural gas-fired air-conditioners has been built at the research laboratory and one conditioner is now under test."

WESTERN KENTUCKY GAS COMPANY

One of the largest net income increases was made by Western Kentucky Gas, Owensboro, Kentucky. It was up 25 per cent from the year before. This was due to growth in the area and to the aggressive spirit of the company:

"The population of the cities and communities served by your company continues to grow. Consistent with the announced policy to keep abreast of the residential and industrial growth of the area, 111 miles of new gas mains were installed during 1955. Service was commenced to 3928 new customers and improvement to permit delivery of the increased demands for gas from the facilities of the existing system were installed at a total cost of approximately $1,800,000," stated the annual report.

Net income was 7.6 per cent of operating revenue and 5.2 per cent of the net fixed assets. ★ ★ ★



CLARK

CLARK BROS. CO., Olean, New York—Gas turbines, engines, and reciprocating, centrifugal and axial flow compressors — gas, steam, electric and diesel driven.

DRESSER IDECO

DRESSER-IDECO DIVISION, Columbus, Ohio — Radio and television broadcasting towers, steel buildings, aircraft hangars, mechanical parking garages, electric power substations.

DRESSER MANUFACTURING DIVISION

DRESSER MANUFACTURING DIVISION, Bradford, Pa. — Pipe line couplings, pipe repair sleeves and clamps, weldments, forgings, welding fittings, flanges, rings.

IDECO

IDECO, Dallas, Tex.—Hydrair Power Rigs; Full-View Ma Substructures; Single, Dual Drive-In Rambler Rigs; Blo Swivels, Rotaries; Mud Pu Petroleum Equipment and Supp

Magcobar

MAGNET COVE BARIUM CORP., Houston, Tex.—Magcobar and Magcogel drilling muds and other specialized oil well drilling fluids and chemicals.

PACIFIC

PACIFIC PUMPS, INC., Huntington Park, Calif. — Centrifugal pumps for refineries, power stations, pipelines, and chemical plants; plunger pumps for oilwells.

ROOTS CONNERSVILLE

ROOTS-CONNERSVILLE BLOWER DIVISION, Connersville, Ind.— Rotary positive blowers, gas pumps, centrifugal blowers, exhausters, and positive displacement meters.

Security

SECURITY ENGINEERING DIVI Dallas, Tex., Whittier, Calif. — bits, reamer rock bits and openers; reamers, casing sc and Neo-Red rubber stabil

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...it identifies all Dresser Companies and their products... it is your guarantee of the DRESSER *plus*+

You gain an important extra plus value every time you are served by any of the Dresser companies. This is the unique way Dresser operates to serve you better. Each Dresser company works independently to assure maximum individual attention to your specific needs . . . yet all are teamed together in a single organization to provide a group of research, engineering, and manufacturing services. From Dresser you obtain equipment based on the over-all experience of many companies in many industries.

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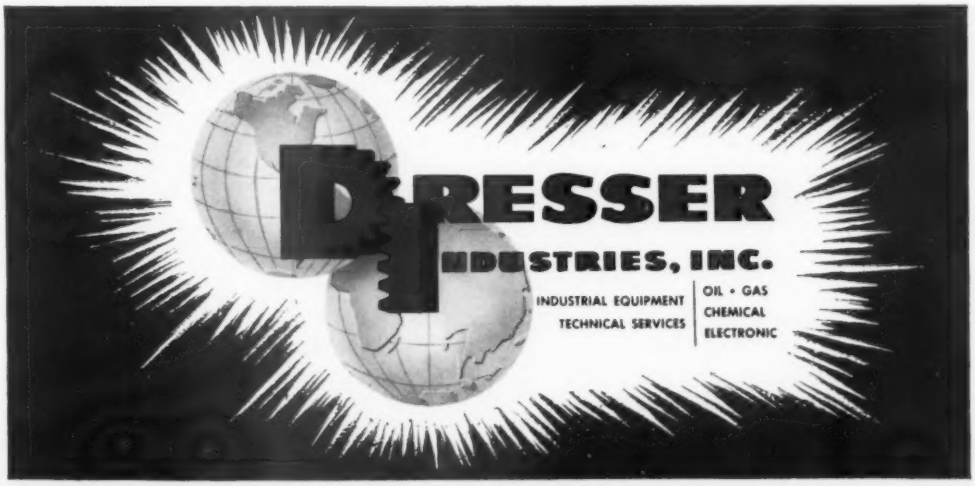
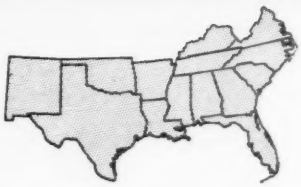


REPUBLIC NATIONAL BANK BUILDING • POST OFFICE BOX 718 • DALLAS 21, TEXAS



Pioneer Natural Gas

"Kitchen Fashion Shows" For Builders Highlight Intensive Promotion Program

Beginning in 1955, Pioneer Natural Gas Company inaugurated its first "Kitchen Fashion Show." The show is designed to introduce and win acceptances of built-in automatic gas ranges — personal invitations have been mailed to all manufacturers of built-in gas ranges to participate in these shows and exhibit the best of their line.

In 1955, nine manufacturers, distributors and manufacturer representatives participated in the three shows held in Midland, Lubbock and Amarillo, Texas. The 1955 Kitchen Fashion Shows were limited to showing the ranges to only builders and contractors. Over 500 personal invitations were mailed to builders, contractors and architects, inviting them and their wives to attend these closed showings and dinners. Prior to these three shows very few built-in gas ranges were being installed in the area Pioneer Natural Gas Company serves. Following the exhibits there was a marked increase in the number of built-in gas ranges being used in new construction by builders and contractors.

Following the exhibits Pioneer participated in two Home Shows, one in Lubbock and the other in Amarillo, in which company personnel demonstrated built-in gas ranges to the public.

The company also participated in three fair exhibits showing the built-in units to over 100,000 people during 1955.

In 1955 H. N. Oldham, Pioneer's new Business Manager, organized a Utilization Department and two men were employed to call on builders, contractors and architects, and prospective buyers of built-in gas ranges. Although Pioneer does not merchandise it is possible for direct sales as a result of the Utilization men's personal contacts with these people.

In March, 1956, the company held its second annual Kitchen Fashion Shows. Again over 500 builders, contractors and architects and their wives were invited to a dinner and a closed showing of the built-in units. These closed meetings were held in Amarillo, Lubbock and Odessa, Texas. On the following day of each private showing a public showing was held and a built-in gas range (winner's choice) was given away.

Fourteen different brands of built-in gas ranges were shown at these six exhibits. Salesmen were taking orders on the floor during these six showings. At least a car and a half of built-in gas ranges were sold during the recent Kitchen Fashion Shows. The manufacturer representatives and distributors were very pleased with the results and its anticipated the initial sales results are only a small part of the sales to come.

In April, 1956, the company is again participating in two Home Shows, in which built-in gas ranges will be exhibited. It is expected that company personnel in 1956, will again show built-in gas ranges to more than 100,000 people.

The previously-mentioned shows were publicized through television, newspaper and over radio. These three advertising outlets are continually used to emphasize the conveniences and desirability of using built-in gas ranges. Many of the builders and contractors who previously did not use built-in gas ranges are now going "All Gas."

Another recent successful promotion was a tie-in with Colgate "Ad" detergent and the Bendix Duomatic. At the end of this promotion the distributor of duomatics had only four left in his warehouse. Window displays and floor displays were used to publicize this promotion and a tie-in was made with an Amarillo chain of supermarkets in which the distributor and local duomatic dealer and supermarket gave away a Bendix duomatic and three Bendix Deluxe gas dryers. The result at the end of this promotion proved very successful.

Pioneer Natural Gas Company's 1955 "Old Stove Round Up" resulted in the second largest number of gas range sales in the history of the company's Old Stove Round Up activities. Approximately 45 per cent of the ranges sold during the 1955 Old Stove Round Up were "CP" ranges.

During the Old Stove Round Up campaign, which lasted approximately seven weeks, the company gave the range salesmen a bonus of $2.00 for each Standard range they sold and $4.00 for each "CP" range that was sold. Most of the distributors matched Pioneer Natural Gas Company's promotion payments and many of the larger stores duplicated the promotion. A point system was set up for the salesmen to follow and this stimulated a great deal of activity. The points were based on the day of the sale and on "Standard" or "CP" customer purchase.

Seven $100.00 "Salesmen Awards" were made at the end of the campaign. These awards were made to the seven salesmen having the highest number of points. Attached is a sales brochure explaining in more detail the 1955 Old Stove Round Up program.

The company also participated in a "Cavalcade of Homes" and a "Parade of Homes." A total of 12 homes were constructed in the Amarillo Parade of Homes. All 12 featured central gas heating and automatic gas water heating equipment. Eight of the homes featured built-in gas ranges and automatic gas clothes dryers. Five of the homes were equipped with Servel gas refrigerators. One of the houses featured a Moonglow Anti-Prowler gas light.

In Lubbock, 17 houses were constructed in the Cavalcade of Homes. One house was equipped with gas central heating, built-in gas range, Servel gas refrigerator, a Hamilton gas clothes dryer and two anti-prowler gas lights. Eleven of the other homes were equipped with built-in gas ranges and all 17 had gas central heating system and gas water heating system. Eight of the homes were equipped with Servel Gas refrigerators, and five featured automatic gas clothes dryers. The Lubbock "all-gas" home was given away by the Home Builders Association to promote its work.

Promotion and sales programs for Old Stove Round-Up were outlined for employees at company-wide rallies.

"Western" attire was uniform of the day during the seven-week range selling campaign.

Atlanta Gas Light

After 27 Years, "Old Stove Round-Up" Is Still Powerful Sales Producer

The Old Stove Round-Up promotion, which was originated by Atlanta Gas Light 27 years ago, proved again during the 1955 campaign to be a powerful sales producer.

The Round-Up, used nationally now by the gas industry, has been an annual late summer sales event at Atlanta since its origin with the exception of the war years. The 1955 Round-Up lasted seven weeks — from mid-July to mid-September.

Chief consideration in planning the 1955 Round-Up was to determine the most effective means to combat the stiff competition of electric range sales in the areas served by Atlanta Gas Light Company. To attain the sales quotas, top trade-in values for old ranges and low down payments were allowed. It was thought these would prove the best sales stimulants and at the same time permit the upgrading of range sales and raising of the unit range sale.

Super trade-ins were offered on all standard side and de luxe models and substantial trade-ins scaled downward slightly on medium priced models. Trade-ins were not offered on any range selling for less than $200.

Concessions were also made on down payments deviating from the company's long-time policy of 10 per cent or more down payment on all range sales. During the Round-Up, $10 would deliver any range selling for a net cash price up to $299 after trade-in, and only $15 was required on ranges selling for net list price of $300 or more after trade-in. On this basis, the minimum down payment ran from one-third to one-half less than the standard down payment.

Displays used in the Round-Up promotion in 1955 were unusually colorful and attractive. A western atmosphere was created in window and floor displays by using sombreros, bandannas, colored pennants and banners as merchandise background.

A strong advertising campaign backed up the Round-Up. Advertising was placed in the two metropolitan papers in Atlanta which have state coverage and in local papers in the communities served by Atlanta Gas Light Company.

Three television programs sponsored by the Company also featured the Round-Up theme. On "News of the World" on Atlanta's WSB-TV each week day, a western background was used for the announcer and the commercials featured Round-Up values in ranges. Atlanta's other television show "The Blue Flame," a 30-minute weekly cooking program on station WAGA-TV, dramatized the Round-Up promotion in the appliances demonstrations. Members of the Home Service staff conducting the program dressed in western garb. Macon's week-day news program on station WMAZ-TV stressed the Round-Up.

Radio spots were also used to build up the promotion.

A folder for mailing was prepared in the Advertising Department. It included a prepaid post card designed for the customer to return to the sales department as a request for an appraisal of his old stove. The folder printed in three colors turned out to be a most effective handout piece for use on the sales floor and by members of the sales forces when canvassing.

A dealer participation program was set-up with prizes totaling $1000 offered by Atlanta for the best dealer newspaper advertisement, window display and floor display in the territory served.

One of the highlights of the 1955 Round-Up was the remarkable sales record set by Paul Freeman, of the Macon Division of Atlanta Gas Light Company. His sales amounted to 116 gas ranges during the Round-Up or 10 per cent of the total sales made by the entire sales staff in the company.

The 1955 Old Stove Round-Up proved to be one of the most successful merchandise promotions in Atlanta Gas Light Company's history with quotas exceeded more than 10 per cent.

Help Wanted

FOR A VITALLY-IMPORTANT

Twelve forward-looking manufacturers of equipment used by the gas industry are investing their money to help increase the sale of gas and of gas-burning appliances and equipment. These manufacturers know that as the gas industry goes, so goes their business.

The job that needs doing is too big for twelve manufacturers. Every supplier to the industry is invited to share in this business insurance program, under the direction of the Equipment Manufacturers' Advisory Committee of GAMA.

HOW YOU CAN BENEFIT

Mr. Supplier. Help insure your future earnings by investing in this program.

Mr. Utility. Make this program pay extra dividends for you by mailing proofs of these ads to your dealers and running these ads in your newspapers over your company name. FREE reprints and mats are available.

Published as a Service to the Gas Industry by

AMERICAN METER CO. EST. 1836 MEASUREMENT ENGINEERS

AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

JOB THAT NEEDS DOING
Gas GIVES YOU MORE FREE TIME
7 ways Gas makes your home modern as tomorrow
Gas
GAS is 7 ways better for the 7 big household services
OPERATION HOME IMPROVEMENT

National advertisements like these, designed to increase the sale of gas, are paid for by the following Suppliers to the Gas Industry.

A. C. Lawrence Leather Co.
American Cast Iron Pipe Co.
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Fisher Governor Co.
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Mueller Company
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MidSouth Gas Company

Business Builder Campaign Stimulates Sales

MidSouth Gas Company serves 51 cities, towns, and communities in Eastern Arkansas. Since the area served had few gas appliance dealers, MidSouth started merchandising in 1953 to build load, as well as to stimulate the market so that appliance dealers would pitch in and get a share of the business.

From the inception of the merchandising program, it was realized that maximum results from a limited sales force could only be obtained by providing the salesman with the maximum number of bona fide prospects. Contests or campaigns have been in progress at all times, using not only the sales force but also all company personnel. The following two campaigns proved to be successful:

Business Builder Campaign

All company employees were eligible to participate. A flat bonus was paid an employee who turned in to the salesman a prospect resulting in a sale, $4.00 for a new range, refrigerator, dryer, or water heater, and smaller amounts for seasonal heating equipment.

After several months experience, allowing employees to proceed on their own initiative in securing prospects, it was felt they could be motivated to do a better, more thorough job of covering their respective towns. At this point, the program really assumed the status of a Business Builder Campaign. Point values were assigned to each of the appliances sold, being about 25 times the dollar value of the employee bonus on the sale resulting from his prospect.

There was a need for as much employee participation as possible. Realizing that competition on a company-wide basis amongst such a large group might stifle the competitive spirit, the campaign was set up to reward the best performance monthly in each of the eight districts. Merchandise prizes were given to the employee accumulating the highest number of points within each district. Retail values of the prizes were about $15.00 to $20.00 and the cost of about one-fourth of the retail price, or a cost of about $40.00 per month.

From these eight District Builders, the "Builder of the Month" was selected. This was the employee with the highest point score company-wide to whom was awarded, in lieu of the district prize, a 17-jewel wrist watch. This item had an average cost of about $20.00, the monthly prize budget being about $60.00.

Cumulative points were also carried for each employee from month to month and a "Builder of the Year" award was made at the end of the campaign. It was felt that these additional awards would stimulate employees individually to greater effort than they had been making previously under the bonus system alone.

To assure the interest of, and closer supervision of, the district managers, a wrist watch was awarded to the one who had two employees win the "Builder of the Month" award during the campaign. Under this plan, two district managers won watches.

It became apparent that the employee efforts were resulting in considerable sales of appliances by dealers, in addition to increasing company sales volume, so it was decided to reward the employees for their contribution to the sales even though company forces did not make the sale. Although the company could not afford to pay bonuses on them, the employee was credited with points in the Business Builder Campaign.

Mechanics of keeping up with the results were quite simple. The Appliance Prospect Card, upon which bonuses were paid, was used. Its normal routing included approval of the bonus paid by the General Sales Office. The only additional step required for this contest was the tabulation of points by the sales department secretary. Monthly reports of the standings were made and distributed to all employees.

Results

Over 78 per cent of all district personnel was responsible for one or more sales within a six-month period.

One-third of the major units of appliance sales stemmed from this campaign.

Of all eligible employees, 35 per cent were credited with at least one sale each month. The highest percentage was 43 per cent. Some districts that were more active than others had as much as 75 per cent participation.

With this Business Builder Campaign he sales force was augmented many times with part-time "employee salesmen."

Range Demonstration Campaign

The object of the Range Demonstration Campaign was to get the modern gas range into the housewife's kitchen and allow it to sell itself and to inspire all employees to make arrangements for said demonstration. The time allotted for this effort was four weeks. The preferred time, of course, is in the summer period.

Each salesman was assigned a minimum quota of 15 such demonstrations during the four weeks period. Emphasis was placed on making the demonstration rather than the sale; in fact, playing it up as an advertising campaign to acquaint people with the benefits of the modern automatic gas range. Employees stressed that in gaining the consent of the housewife to cooperate.

The contest and award features were arranged as follows: A Royal Chef Barbeque Grill (cost $18.00) was awarded to the employee arranging for the most demonstrations each week, plus a $4.00 bonus should a sale result. One barbeque grill each week was awarded the manager whose employees rounded up the most demonstrations. One barbeque grill each week was awarded to the salesman with highest volume. A choice of a barbeque grill, or a radio, was awarded to salesman with highest percentage of sales made from 15 or more demonstrations during entire contest and, also, to the manager supervising said salesman.

Results

The results of this effort were very gratifying. More ranges were sold during the four week period than the previous five months. 248 demonstrations were made, with 70 per cent resulting in sales.

High salesman sold 97 per cent of demonstrations.

Second salesman sold 82 per cent of demonstrations.

Third salesman sold 78 per cent of demonstrations.

In addition to company sales, the dealers made sales as a result of this activity. No effort was made to determine the number of these sales.

Exterior view of trailer.

Interior view of kitchen display.

United Gas Corporation

Trailer Takes Display Directly to Prospects

Having difficulty in getting home builders in the City of Houston to visit show rooms, etc., so as to see newest developments in gas built-in cooking equipment, the Houston Division of United Gas Corporation has equipped a large demonstration trailer, owned by the Company, with a display of representative gas built-in ranges.

This trailer is taken directly into the sub-divisions where builders are operating, or directly to the office headquarters of builders, making it easy and convenient to get the builders to see the equipment and gives us an opportunity to talk sales with them.

By taking it directly to job sites, it also helps in being able to have carpenters and cabinetmakers come in for a minute and get some first-hand instructions and information on installing built-ins.

The trailer is equipped with five different brands of gas built-ins, plus a Servel ice maker refrigerator. All of the appliances are "live", as the trailer is supplied from its own butane tank. The trailer is air conditioned, powered from a generator carried in the special truck that goes with the trailer.

General practice is to have the trailer work for several consecutive days in one major sub-division, where considerable building activity is going on, and then moving to another. Specific visits to various builders' offices are made as opportunity arises.

This has proved a splendid means of getting builders to actually see various brands of gas built-ins, and, while in the trailer, gives United's personnel and the builders opportunity for an uninterrupted discussion on the subject over a cup of coffee.

The trailer has been in use for several years and has been used for a number of purposes during that time, both in Houston and in outlying territories.

The current program with built-in ranges is carried on under the supervision of Houston division sales manager W. M. Stephens, and Houston division sales promotion supervisor, Tom Lee.

Promoting Sale of Gas Appliances Takes Many Forms

South Georgia Natural Gas Company, Thomasville, Georgia, a transmission company that has only been in operation the past seven months, doesn't sell or service any type of gas equipment. But the firm has underway a cooperate advertising program with local appliance dealers in its area that will consist of newspaper display ads and a weekly 30-minute television program.

The purpose, of course, to build the appliance load on its system. If successful, relates Robert C. Sise, sales manager, the program will be expanded. If not, another approach will be tried.

Roanoke Gas Company, Roanoke, Virginia, has had an intensive merchandising and promotional program underway in its service area for the past five years.

Result, says E. V. Bowyer, sales manager, has been an increase of over 200 per cent in natural gas sales in the Roanoke area.

Community Public Service, Fort Worth, Texas, actively sells gas merchandise in two cities and is getting good results. Emphasis, according to Jackson Cox, assistant merchandise manager, has been on vented heating units and all-year air conditioning, with gas clothes dryers added in the past few months. The firm annually conducts an "Old-Stove Round Up" campaign.

Gas Light Company of Columbus, Columbus, Georgia, has found the campaigns and promotions outlined by AGA very satisfactory in its merchandising program. The four-part program consists of a spring Range Sale, a summertime Refrigerator Sale, the Old Stove Round-Up in the autumn months, and water heater campaign in the winter.

This year the company is pushing the Spring Range Sale by offering large trade-ins and other inducements. An even bigger summer Refrigerator Sales Campaign is predicted for this year. And, notes the company, "there is nothing like the Old Stove Round-Up with its western flavor, which is vigorously pursued each fall.

BEST TOGETHER

best gas odorant—best odorant service

Calodorant "C"

Your best quality sulfide type

The only natural gas odorant in use that is completely stable in high pressure lines—1000 psi or more—and at low temperatures—0°F or lower. Calodorant "C" is equally effective at medium and low pressures in either transmission or distribution systems—large or small.

Alert "80"

Your best economy-priced, quality mercaptan

Today's more demanding operating conditions wrote the specifications for Alert "80". It has been proved in all types of distribution systems, has met every test by large and small utilities. Alert "80" is a selected and blended group of mercaptans with precision blending and balancing—giving better, full range volatility and stronger initial "punch."

Specialists in odorization problems!

Want to know how to neutralize odorant "spills" or need help on a critical odorization problem? Ask Oronite about any problem you may have—chances are we have already done the research and have the answer.

Oronite Odorometer

Offers the simplest way to test odor intensities in your distribution system. Ask for a demonstration by contacting the Oronite office nearest you.

ORONITE CHEMICAL COMPANY

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3684

ORONITE CHEMICAL COMPANY

Glossary of Gas Industry Terms—A to Bu

A

Absolute Pressure: Gage pressure plus atmospheric pressure.

Absolute Zero: Absolute zero is the temperature at which a gas would show no pressure if the general law for gases should hold for all temperatures. It is equal to—273.18 C. or—459.72 F.

Absorbent Oil: Liquid used to dissolve vaporized components from a gas.

Absorption: The extraction, from an atmosphere or mixture of gases or liquids, of one or more fluids, by the substance of a porous material with which the atmosphere, gases or liquids come in contact. The absorption or extraction process causes or is accompanied by a physical or chemical change, or both, in the sorbent material. See and note difference in Adsorption.

Absorption Refrigeration System: System in which refrigerant vapors, after passing through cooling coils, are absorbed in a second liquid and then released by application of heat. The refrigerant vapor from the absorbent is then condensed to a liquid and returned to the cooling coil to evaporate and thereby remove heat from cooling coil.

Acceleration: The rate of change in velocity, usually expressed in terms of distance, per unit of time, and often accompanied by unit of volume.

Accident Frequency Rate: Number of injuries, including disabilities and fatalities, per million man-hours worked, and occurring during employment. Each disability counted results in at least one day's loss-of-time.

Accident Severity Rate: Number of days lost due to disabling injuries, per thousand man-hours worked. Appropriate time charges are made for permanent disability and fatality.

Actifier: Equipment used to remove and absorbed material from absorption oil, thereby enabling reuse of the absorption oil.

Activated Carbon: Carbon of vegetable origin with high adsorptive capacity, used as the medium in air and gas filters.

Adiabatic: A term that describes a process in which no heat is added to or taken from a material that is being subjected to the process.

Adsorption: The extraction, from an atmosphere or mixing of gases or liquids, of one or more fluids, by surface adhesion to the material with which the atmosphere, gases or liquids come in contact. The adsorption or extraction process does not cause and is not accompanied by either a physical or chemical change in the sorbent material. See and note difference in Absorption.

Aerify: To change into a gaseous form. To infuse or force air into; to combine with air.

Aerogene Gas: The gas produced by the system of carbureting air devised by Van Vriestland.

Aerometer: An instrument for determining the density of gas.

After-cooler: Heat exchanger used to cool gas after it has been compressed.

After-cooling: The process of cooling compressed air or gas, as that may be required, immediately after compression.

After-cracking: Process in which gas is further decomposed after distillation from coal, generally accompanied by the production of ammonia.

AGA: Abbreviation of American Gas Association.

Air: A mixture of nitrogen, oxygen, water vapor, carbon dioxide, argon, neon and small quantities of other rare gases. For all practical purposes of combustion, air may be said to be composed, by volume, of Oxygen (O_2)—20.9 per cent; Nitrogen (N_2)—79.1 per cent; and, by weight of Oxygen (O_2)—23.15 per cent; Nitrogen (N_2)—76.85 per cent. Weight of air at 60 F is .076 lb per cubic foot at sea level, atmospheric pressure. One pound of air at 60 F and at atmospheric pressure has a volume of 13.06 cu ft.

Air Blast: Air, under pressure, blown into a furnace or other equipment.

Air Compressor: See: Compressor.

Air Conditioning: The process of heating, cooling, humidifying, drying or otherwise treating air in a room or building to maintain a specified temperature and relative humidity.

Air Cooled Condenser: A piece of equipment for condensing and cooling a vapor by means of a current of air passed over the equipment. See: Condenser.

Air, Dry: A psychrometric consideration, air that does not contain and is not mixed with any water vapor.

Air-Gas Ratio: The ratio of the air supply to the gas supply, necessary to achieve a desired character of combustion.

Air Intake: The volume of air entering a piece of equipment. Also, the opening through which air is admitted to the equipment.

Air Port: See: Air Intake.

Air Purge: Cleaning or removal of objectionable materials from equipment by means of an air blast. Also, one step in the cyclic process of making blue or water gas.

Air, Saturated: A mixture of dry air with its maximum capacity for water vapor.

Air Shutter: An adjustable plate, flap, or louvre or set of them, mounted over an air port to control the flow of air through the port.

AISI: Abbreviation of American Iron and Steel Institute that appears together with system of numbers for common and alloy steels.

Alloy Steel: By common custom steel is considered to be alloy steel when the maximum of the range given for the content of alloying elements exceeds one or more of the following limits:

manganese	1.65 per cent
silicon	.60 per cent
copper	.60 per cent

or in which a definite range or a definite minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels:

aluminum
boron
chromium up to 3.99 per cent
cobalt
columbium
molybdenum
nickel
titanium
tungsten
vanadium
zirconium

or any other alloying element added to obtain a desired alloying effect.

Allowable: Largely a Texas term meaning the daily legal oil or gas that can be produced, as set by the Texas Railroad Commission, which is the governing body for all oil and gas operations in Texas.

Ambient Temperature: The temperature of the air, atmosphere or other fluid that completely surrounds the apparatus, equipment or the workpiece under consideration.

Ammonia: A gaseous compound, NH_3, readily absorbed by water, derived from, among other sources, manufactured and natural gas.

Ammonia Liquor: Solution of ammonia in water, as it is obtained in recovery of ammonia from coal gas. Sometimes called ammoniacal liquor.

Ammonia Still: Equipment used to distill pure ammonia vapor from ammonia liquor.

Ammonia Washer: Equipment used to wash ammonia vapor out of coal gas. A mechanical means of mixing the coal gas and water so that ammonia can readily dissolve in the water.

Ampere: Practical unit of current and is that current which flows through a conductor having a resistance of 1 ohm and a difference of potential of 1 volt between its ends.

Annealing: A process involving heating and cooling applied usually to induce softening of metals. The term also is used to cover treatments intended to remove stresses, alter mechanical or physical properties, produce a definite microstructure, and remove gases.

Annealing, Bright: A process that is usually carried out in a controlled furnace atmosphere so that metal surface oxidation is reduced to a minimum and the surface remains relatively bright.

Anode: Positive pole in an electrolytic system, such as applied in cathodic protection; the electrode at which oxidation or corrosion occurs. See: Cathode and Cathodic Protection.

Anodic Coating: Protection of a metal by providing for preferential chemical attack through the formation of an electrochemical couple. A coating of zinc on steel is typical.

Anticline: Also called dome, the upward geological fold in rocks that is important for possible accumulations of oil and gas.

API: Abbreviation of American Petroleum Institute, used with numerical designations of oil densities.

Appliance Regulator: A device for automatic control of some phase of operation of a gas appliance or other gas equipment.

Aromatic Compounds: Compounds derived from the hydrocarbon benzene (C_6H_6), distinguished from those derived from methane (CH_4).

ASA: Abbreviation of American Standards Association.

Asbestos: A fibrous mineral that is heat and fire-resisting; used in the form of paper, cloth and mortar mixtures for insulation.

Ash Pit: The space below the fire bed grate of a furnace or boiler into which ashes from a solid-fuel fire drop.

ASHVE: Abbreviation of American Society of Heating and Ventilating Engineers.

ASM: Abbreviation of American Society for Metals.

Asphalt Base Oil: Oil that leaves an asphalt-like residue when distilled.

ASME: Abbreviation of American Society of Mechanical Engineers.

Associated Natural Gas: Natural gas that is free, in immediate contact, but not in solution with crude oil in reservoirs.

ASTM: Abbreviation of American Society for Testing Materials.

Atmosphere: Mixture of gases comprising air. Also, mixture of gases within any specified chamber such as in a furnace combustion chamber. Also, a unit of pressure equal to 14,696 lb per square inch at sea-level.

Atmosphere, Neutral: In a furnace or heating operation, neither oxidizing nor reducing, and indicates a state of perfect combustion. For a given high-temperature heating furnace this type of atmosphere is usually the ideal and represents maximum fuel economy in combustion.

Atmosphere, Oxidizing: In a furnace or heating operation, an atmosphere in which there is an excess of oxygen or air present. Sometimes it is desired to have such an atmosphere to aid certain chemical reactions. In most cases of furnace heating this type of atmosphere results in waste of fuel and scaling of the work. Also, in some cases, an oxidizing atmosphere exists because it has been necessary to reduce the flame temperature by dilution with cold air for low temperature operations.

Atmosphere, Reducing: In a furnace or heating operation, an atmosphere in which there is a deficiency of oxygen or air to complete the process of combustion. Such an atmosphere is deliberately produced in some operations to aid certain chemical reactions or to preclude scaling or oxidizing of the work. In most cases of furnace heating excessive reducing atmosphere causes a waste of unconsumed fuel and a lowering of furnace temperature.

Atmospheric Pressure: The pressure of the weight of air and water vapor on the surface of the earth. Approximately 14.7 lb per square inch at sea level.

Atmospheric Regulator: A gas regulator of the diaphragm-type that maintains atmospheric or Zero pressure. Also called Zero Governor.

Atoleine, Atolin: A name for liquid petroleum.

Atom: The smallest unit quantity of an element that is capable of chemical combination.

Auglaize: Rich oil and natural gas region in the Lima district of Ohio.

Automatic Control: Mechanical system by which the conditions of a process or operation are maintained at specified values and times without direct dependence upon a human operator.

Automatic Safety Pilot: A small burner for igniting the main burner of gas-burning equipment, connected so that if the flame of the pilot burner is extinguished for any cause, the gas supply to the main burner is automatically shut off.

Automatic Shut-off Valve: A valve that automatically shuts off flow when a specific, predetermined condition or time is attained.

Auxiliary Regulators: Small controls used in addition to, or to assist, larger main controls.

Available Heat: The heat available for useful purposes, arrived at, in general, by subtracting dry flue gas and moisture losses from the gross heat released into a combustion chamber.

B

Back-fill: Earth that has been replaced in a ditch or trench after pipe or other device has been installed.

Back-fire: An explosion that takes place when too much primary air is mixed with gas, forming an explosive mixture that, igniting from the burner, burns in the mixing chamber.

Back-pressure: Pressure against which a fluid is flowing. May be compounded of friction in lines, restrictions in pipes, valves, pressure in vessel to which fluid is flowing, hydrostatic head, or other impedient that causes resistance to fluid flow.

Back-pressure Valve: A valve so constructed that fluid will flow in one direction only and if back pressure becomes sufficient to reverse fluid flow, valve will close. Also called a Check Valve.

Back Run: A stage of a cyclic process process in which flow of the fluid is reversed through the equipment.

Baffle Plate: A plate placed in a tank or other receptacle that controls the direction of flow of a gas or fluid. It is a guide plate placed to divert the stream.

Baffles: Plates, louvres or screens placed in the path of fluid flow so as to cause change in the direction of flow; used to promote mixing or to knock out undesirable solid or liquid particles in the fluid stream.

Bailer: Used in cable tool drilling, a simple tube suspended on a cable with a foot-valve at the bottom and open at the top. The foot-valve opens when the bailer touches the bottom of the drilled hole, permitting water with drill-cuttings in suspension to enter the tube. When the bailer is raised to be emptied, the foot-valve closes instantly as it loses contact with the bottom of the hole and retains the water and drill-cuttings.

Balance (Gas): A balance used for determining the specific gravity of gases.

Balance Governor: A type of governor in which the moving parts of the mechanism are counter-balanced by adjustable weights.

Band Wheel: Part of cable tool drilling equipment, a large wheel turned by a belt that is connected with the drive engine and fitted with a crank-like arrangement on one side that, progressively, results in the rising and falling action of the cable from which the drill bit is suspended.

Bar Hole: Hole made in ground along route of gas pipe when barring for leaks.

Bar Test Survey: Leakage surveys made by driving or boring holes at regular intervals along the route of an underground gas pipe and testing the atmosphere in the holes with a combustible gas detector or other suitable device.

Barometer: An instrument that measures atmospheric pressure in terms of inches, centimeters or millimeters of mercury column.

Barometric Pressure: The pressure of the atmosphere as determined by a barometer. See: Atmospheric Pressure.

Barrel, Oil: 42 U. S. gallons.

Base Pressure: The pressure used as a standard in determining gas volumes. Volumes are measured at operating pressures and then corrected to base pressure volume.

Base Pressure Index: A conversion factor used to correct gas volume at operating pressure to volume at base pressure without regard for any correction for temperature.

Base Volume Index: A conversion factor to correct gas volumes, measured at operating temperature and pressure, to volume at base temperature and pressure.

Batch-type Furnace: An industrial furnace in which material is heated or processed in batches. For comparison, see: Continuous-type Furnace.

Battery of Coke Ovens: A group of coke ovens arranged in a line, side by side.

Bell-and-Spigot Pipe: Pipe made with a cup like flare at one end (the bell) and a rolled bead at the other end (the spigot). The spigot is set into the bell and the joint packed with caulking and lead to seal it.

Bell Hole: An enlarged hole dug in a trench to allow room for workmen to make a joint in pipe, such as caulking bell and spigot pipe or welding steel pipe.

Bell Nipple: Used to connect different size pipe; is shaped somewhat like the nipple on a baby's feeding bottle.

Benzene (Benzol): An aromatic hydrocarbon found in manufactured gas and coal tar.

Bi-metallic Strip: Two joined parallel strips of different metals. Due to their different coefficients of thermal expansion, variations in temperature will cause the dual-strip to bend. This mechanical action is used to indicate temperature, close or open electric contacts at specific temperatures for control purposes.

Black Body: A material, not necessarily black in color, that would theoretically absorb all radiant energy directed to it.

Black Body Radiation: The theoretical rate at which there is radiation from a black body at given temperatures.

Black Steel Pipe: Ordinary steel pipe.

Blank Flange: A round steel plate bolted to the end of flanged pipe to seal the end of pipe.

Blast: See: Air Blast.

Blast Burner: A burner in which compressed air or a mixture of air and gas is supplied for combustion.

Blast Heater: A device made up principally of heat transfer surfaces that heats air forced into contact by a blower or fan.

Blast Main: Pipe connecting blower or compressor to burner or furnace and through which blast air is delivered.

Blast Period: Time during which blast air is blowing through furnace.

Blast Pressure: Pressure at which blast air is blown.

Blast Valve: Valve for controlling flow of blast air.

Blau or Blue Gas: A mixture of volatile hydrocarbons, such as propane, butane, the pentanes, etc., containing hydrogen and methane, etc., in solution under pressure.

Bleeder: A connection located at a low place in a gas line, and by means of a small valve condensate, water, and oil can be drained from the line without discharging the gas.

Bleeding: The exudation of bituminous material on the roadway surface after construction. The act of draining off liquid from a gas line, or water and B. S. from a tank of oil.

Blow: The preparation period in blue gas manufacture when air is being forced through the fuel bed.

Blow Holes: Passages through fuel bed of a gas generating furnace caused by air blast.

Blow Off: Relieving excessive pressure in a vessel.

Blow Purge: A stage in the cycle of making water gas during which gas remaining in the equipment is purged or blown out at the start of the preparatory air blast.

Blower: A device for forcing air or gas to flow in the desired direction and at greater volumes and higher pressures; it may be either fan, centrifugal or positive displacement.

Blue Flame: Gas flame in which combustibles are completely consumed, leaving no luminous carbon particles to impart yellow or orange color.

Blue Gas: Also called water gas. Made in a cyclic process in which a fuel bed is alternately subjected to blast of air and steam.

Boiler: A heat exchanger, usually heated by fuel flames and combustion gases, that raises water temperatures to the point of formation of steam.

Boiler Compound: A chemical used to treat the feed water of a boiler to eliminate or reduce the water-hardness that would cause scale inside the boiler.

Boiler Efficiency: The ratio of heat absorbed per unit of fuel fired in a boiler, to the heat available in the complete combustion of the same unit of fuel.

Boiler Horsepower: The heat required to convert 34.5 lb of 212 F water, per hour, to steam at 212 F. This is the equivalent of a boiler output of 33,475 Btu per hour.

Boiler Pressure: The steam pressure within a boiler, usually expressed in pounds per square inch gage.

Boom Cat: A tractor equipped with a side boom, used in laying pipe.

Booster: A blower or compressor used to raise pressure or increase flow in a gas or air pipe line.

Booster Station: Where pressure on oil or gas in a pipe line is increased.

Bottle: As used in the ASA code is a gas-tight structure completely fabricated from pipe with integral drawn, forged, or spun end closures and tested in the manufacturer's plant.

Bottled Gas: Liquefied petroleum gas contained under high pressure in cylinders, for convenience in delivering to customers.

Bottle-type Holder: Any bottle or group of interconnected bottles installed in one location, and used for the sole purpose of storing gas.

Bottom Hole Pressure: The basis of all gas, oil or water recovery. Pressure in porous zones pushes fluid into a well.

Bourdon Tube: An arc-shaped or spiral metal tube that is elliptical in cross-section and has one end attached to a pressure-indicating, controlling, or recording device. Pressure changes inside the tube effect its elliptical shape and actuate the device to which it is attached.

Boyle's Law: Explains the elasticity of a perfect gas. The volume of gas diminishes in the same ratio as the pressure upon it is increased, if the temperature is unchanged. For practical purposes this law is found useful in making an estimate of the capacity of an underground gas reservoir.

Bradenhead Gas: In oil wells, natural gas enclosed or confined by a Bradenhead. It applies to all the gas that lies above the oil and through which the drill must go to reach the lower and more profitable oil sands.

Brake Horsepower: The power developed by the engine, as measured at the crank shaft of flywheel by the Prony brake, or other device.

Brazing: The process of joining two pieces of metal by melting a metal that has a lower melting point than either of the pieces to be joined and that will adhere to both pieces, usually with the aid of a flux.

Breeze: Fine particles of coke or ash.

Btu: One British thermal unit, or Btu, is 1/180 of the heat required to raise the temperature of one pound of water from 32 to 212 F, a rise of 180 F. A common nontechnical definition is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Btu Per Cubic Foot: A measure of the heat available or released when one cubic foot of a gas is burned.

Bubble Scrubber, Washer: A type of equipment in which a gas is washed by bubbling the gas in fine bubbles through the liquid.

Bulk Plants for LP Gas: Permanently-installed pressure tanks and required accessory equipment for storing large volumes of LP gas and, in dealer's plants, withdrawing it for refilling bottles; in consumer's plants, withdrawing it for vaporization and utilization.

Bull Plugs: Plugs that are screwed into an unfinished pipe line to keep out dirt.

Bunker C Oil: A classification of heavy residual fuel oil derived as a product of distillation of crude oil.

Bunsen Burner: A gas burner in which primary air enters a tube through an adjustable opening and is entrained by the gas jet discharged from an orifice. The air-gas mixture burns intensely at the end of the tube with a short flame.

Burell-Orsat Apparatus: A device used for the analysis of gases and gaseous products of combustion such as the gases from boilers or exhaust from gas engines.

Burner: A device for mixing air and fuel and burning the resulting mixture.

Burner Block: A refractory block that may take a variety of forms, in which a gas burner assembly is mounted. A number of blocks may be clustered or arranged in any desired pattern and manifolded to the gas piping system.

Burner Capacity: Also burner rating, the maximum Btu per hour that can be released by a burner while burning with a stable flame.

Burner Gas: Any device that is designed to accommodate gas and air, or a mixture of the two, for the purpose of combustion.

Burner Head: The part of a burner at which combustion occurs.

Burner Orifice: The restricted opening or orifice through which gas flows to the air-gas mixing chamber of the burner.

Burner Port: Perforations in burner head at which air-gas mixture discharges and burns.

Burner Tip: An attachment for a burner head that forms a burner port modified for a specific application.

Burner Tunnel: Combustion chamber set in a furnace wall and in which the air-gas mixture is completely burned before entering the furnace.

Burning: The process of combustion in which the chemical combination of oxygen with the fuel produces heat.

Butane: A liquefied petroleum gas, obtained by processing natural gas as produced and, also, from a process in petroleum refining.

Butane-air Plant: A gas generating plant where butane, a by-product of natural gasoline, is mixed with air and delivered into a gas system for use of consumers.

Butt and Strapped Joint: A joint where the ends of two pieces of pipe are united by a sleeve and riveted thereto. The strap may be inside or outside and may be single or double riveted.

Butterfly Valve: A throttling valve made up of a disc that rotates on an axis within the valve body, thereby varying the cross-section that is open to fluid passage.

Part 2 of Gas Fundamentals will appear in the next issue.